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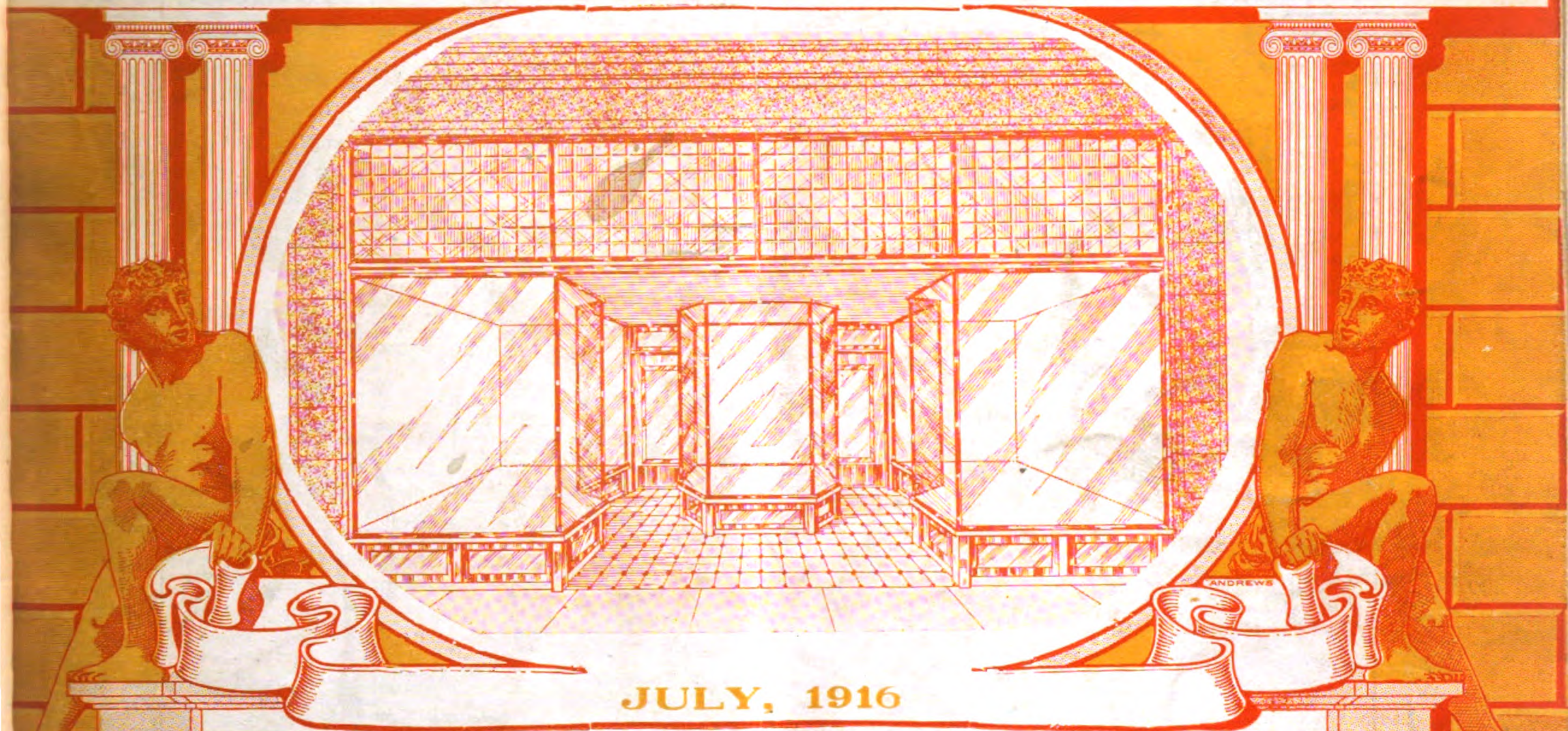

JULY, 1916

VOL. III

NO. 1

A New Era in

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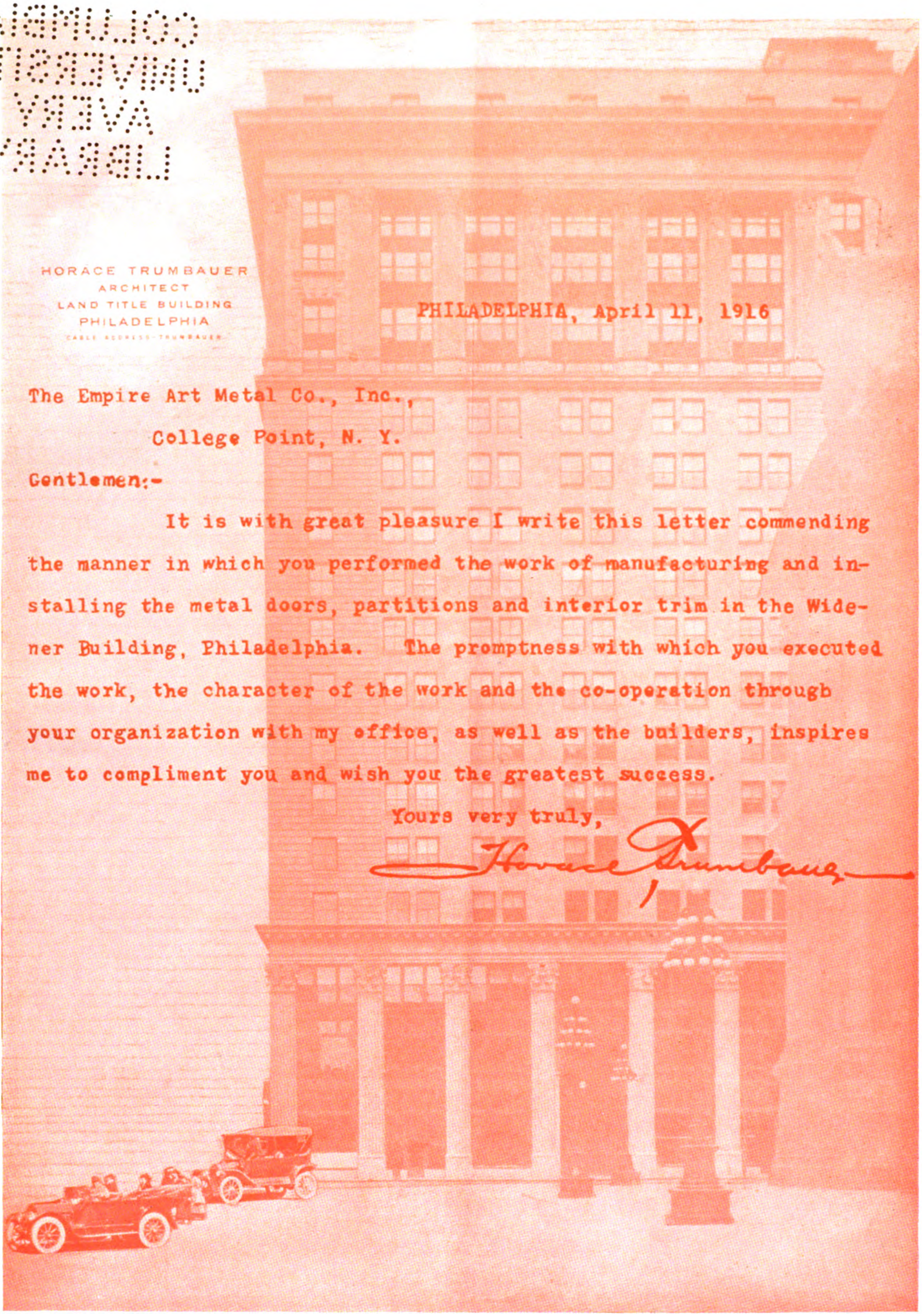

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PHILADELPHIA, April 11, 1916

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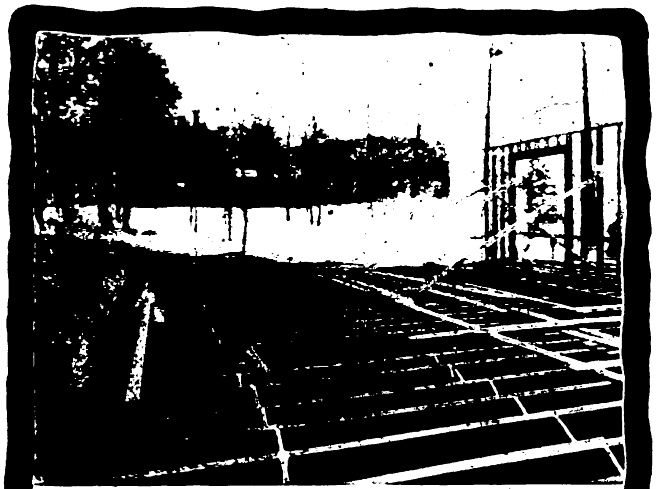

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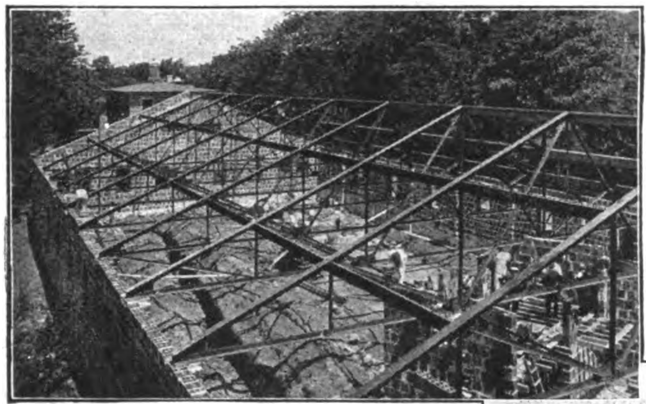
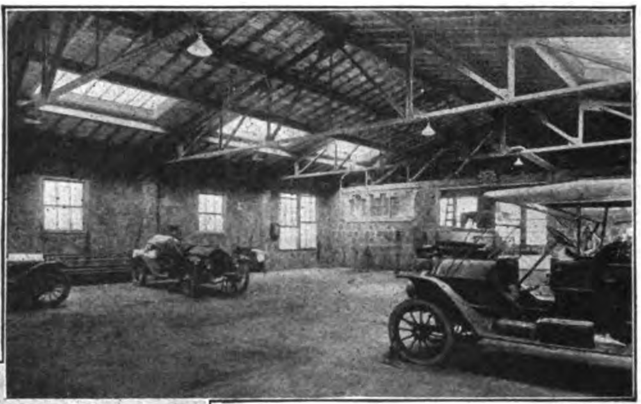


Cowles' Garage, Greenwich, Connecticut; John Locke, Architect. Building is 166 x 75 feet. Built of 12 inch Natco XXX Tile with 24 x 24 inch Hollow Tile piers (not filled with concrete) on which the 75 foot span of the steel roof members bear directly, the load being transmitted through stone bearing plates. Interior partitions 8 inch Natco XXX. Stucco exterior finish.



Newman Garage, Edgewater, New Jersey; Ernest Sibley, Architect. Building is 70 x 120 feet with walls of 8 inch Natco XXX. Stucco exterior finish. Steel roof trusses, span of 70 feet, supported at intervals of 15 feet on 18 inch Natco Hollow Tile piers. Top of each pier has several courses of brick to distribute load over entire column.

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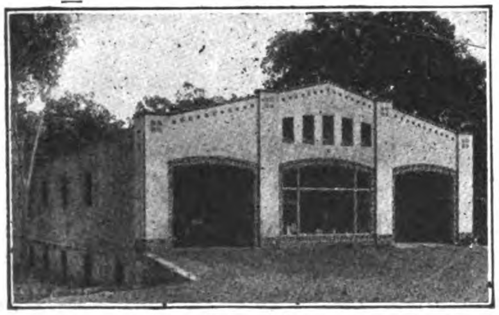
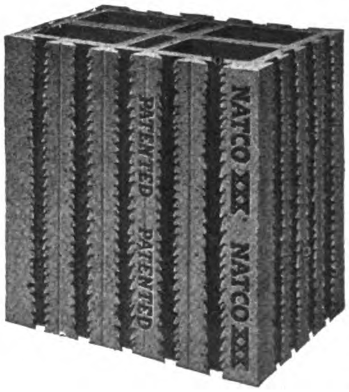


Another view of the Newman Garage, Edgewater, New Jersey, showing the excellent effect of the exterior Stucco finish in combination with face brick trim and mosaic inlays.



Brown Garage, Middletown, N. J.; Ernest A. Arend, Architect. A private garage of architectural effect harmonizing with dwelling. Built of 8 inch Natco XXX Hollow Tile with Stucco finish.

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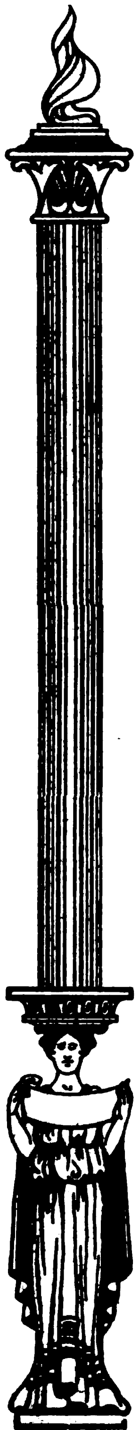

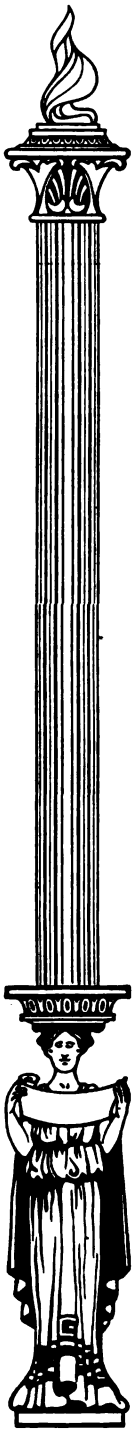

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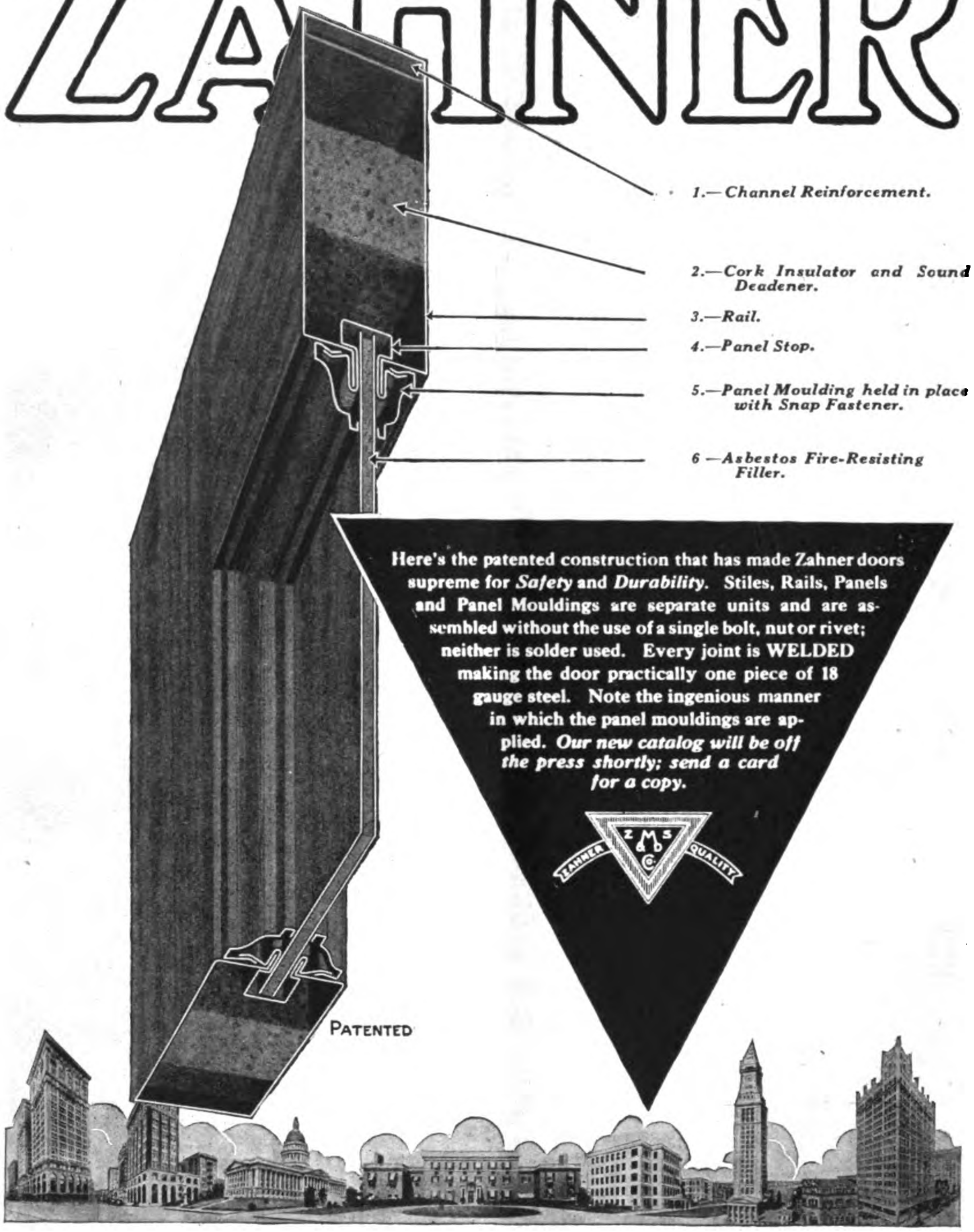
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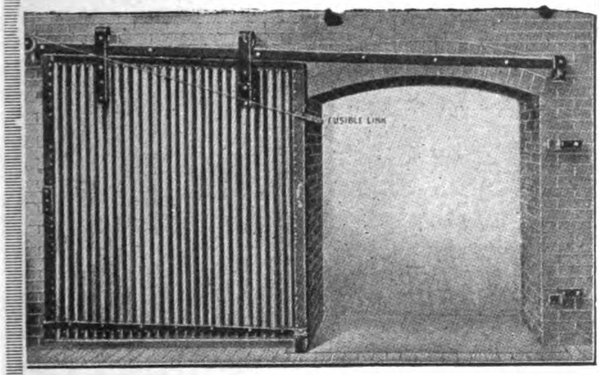

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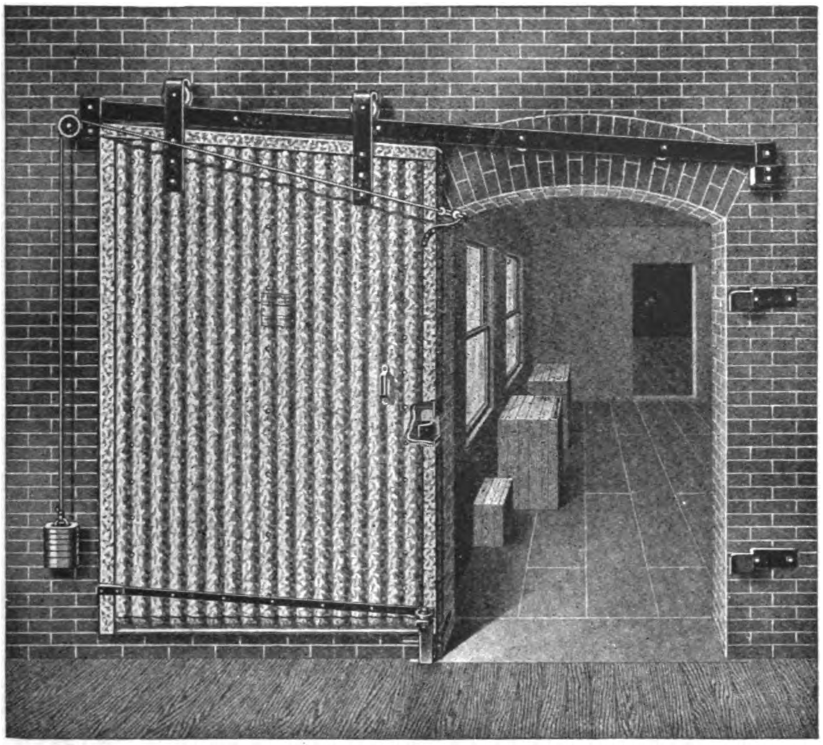

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July, 1916

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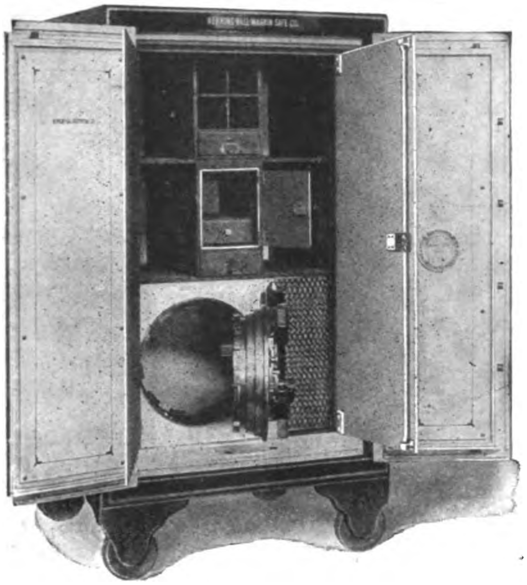

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CONSTRUCTION
WITH A DEPARTMENT DEVOTED TO
SAFE HOMES

VOL. III JULY, 1916 No. 1

A New Era in Store Front Construction

Why retail districts shift in big cities
Advantages of the modern arcade store front
Providing large increase in show window space
The value of safe setting of plate glass
Why differential insurance rates on plate glass should be granted

By C. STANLEY TAYLOR

When one returns to the home city, after years of absence, to find that the former retail thoroughfares, once thronged with shoppers, have been given over to storage warehouses and, on the other hand, streets that were once "side" streets are radiating prosperity through their brilliantly illuminated modern show windows, there comes a realization of the great loss this must have meant to property owners on the now-abandoned retail thoroughfares.

Why the change?

And because we doubt whether this question has yet been satisfactorily answered, as to why an established retail section of an American city moves, bag and baggage, to another street; and believe that modern store front construction exercises a great influence on retail districts, this article is offered as a thoughtful study of store-front engineering, revealing facts and conditions which will prove of interest to architect and owner, retail merchant, plate glass manufacturers and distributors, store front manufacturers and plate glass insurance companies.

—Editor.

A DISCUSSION of the subject of the safe and sensible construction of glass store fronts would seem to divide naturally into two parts: the designing of the front to obtain a greater amount of show window space than is provided for in the average store of to-day; and the safe setting of the plate glass front to lessen the hazard of breakage.

Plate glass is used in every type of store front arcade or otherwise, and it would seem that the proper setting of this glass is of vital importance and should be considered immediately in every detail.

Especially is this true because of the large amount of glass used in the modern front, meaning that the amount of plate glass insurance for store fronts is two or three times as great as it was formerly.

There can be no doubting the fact that a large percentage of the breakage-loss in plate glass is due to improper setting, rather than to accidental breakage. When breakage is traced directly to pressure of wind, vibration, or settling of a building, improper setting will be found the basic cause; but before entering into a description of the proper setting of the glass, it will be well to consider the safety factor as applied to the plate glass business.

The benefit to the merchant and property owner of a more extensive use of plate glass, and the selection of a safe method of setting this glass, is plainly evident. A breakage-loss is similar to a fire-loss in that the tangible loss is covered by insurance; but in both classes of loss there is a more important factor which comes home bitterly to the merchant, a loss that is not covered, and cannot be covered, by insurance. Let us call it the *indirect loss.*

The Indirect Loss

In the case of breakage this indirect loss is suffered by the merchant in the interruption to his business; the loss of time and the inconvenience incident to the replacing of the plate and the removal of stock from the window, and damage to the frame work.

The natural question then is, "Why do the architect and owner not insist on safe setting for the glass?" Here, as in every movement toward safety in building construction, enters the element of lack of knowledge of what constitutes safe construction; the element of increased cost, and that of lacking recognition and co-operation on the part of the insurance companies in the matter of differential rates for safe show window installation.

The Important Matter of Differential Insurance Rates

Lack of knowledge, on the part of property owners and architects, of the subject of safe setting of plate glass, can be overcome by proper educational effort on the part of those who are selfishly interested; the matter of increased cost resolves itself into a question of salesmanship; but the question of the granting of differential insurance rates, predicated on the safe setting of the glass, immediately presents itself as the crux of the entire matter.

The excellent work of the Underwriters' Laboratories in standardizing manufactured products used for fire and accident prevention, and the strong backing of the insurance interests in predicating rates on the use of such standard materials and devices, have resulted in a strong demand for them on the part of the architect and the property owner. Materials and devices of known quality have been created which will lower the insurance rate, because they introduce the factor of safety. Inversely, then, what is more natural than that, when the subject of safe setting for plate glass is introduced to the architect, he should ask, *"Will the insurance rate on glass, as set in this manner, be less?" To-day the answer is "NO."* So the great volume of breakage goes on.

Three or four years ago the plate glass insurance interests demanded the production of safer plate glass settings, threatening to raise the rates on this form of indemnity if such improvement was not effected.

No Encouragement for Safe Setting of Glass

To-day safe settings are obtainable, but no differential ratings are granted, no encouragement is given to the architect to specify safe setting and he does not feel justified in recommending the spending of more money for such safe setting, nor is the contractor going to do it.

Here, then, exists a condition at once unfair and unbusiness-like. The factor of providing safety has entered into every line of insurance, and differential rates have been granted which are graduated downward in proportion to the amount of safety provided.

Public Interested in Safety

Public interest in safety throughout all the walks of life is more and more manifesting itself. "Safety First" signs are to be seen on street corners and in factories, on railroads and local traction lines. Guards for the moving parts of machinery are being provided; associations and municipal bodies are urging safety against fire—everywhere is entering the factor of *preventing losses by guarding against them.*

Behind these movements, at least in their inception and first forwardance, there has been a selfish motive! Railroad and industrial enterprises are interested in lessening the danger of accidents because accidents to employees and to the public do not pay.

Property owners are becoming interested in the reduction of the fire waste because they are beginning to realize what the indirect loss means—the interruption of business and the disrupting of carefully built-up business systems; they recognize the saving in insurance rates through the installation of safety devices, which more than pays, in a very short period, for the extra cost of these devices; insurance interests back the safety movement because it means a reduction of losses which will more than make up for the shrinkage in premium income brought about by differential rates in favor of safety; the manufacturers of fire and accident-preventive materials and protective devices are learning to back the safety movement because it means an increase of their selling field.

The Safety Factor in Insurance

In connection with the subject of the backing of the safety movement by insurance companies, it is interesting to note how, in practically every field of insurance, differential rates are granted by the insurance interests in order to encourage the introduction of safety devices, safe materials and safe practice. What would the fire insurance business be to-day if the companies did not standardize certain forms of protection and grant differential rates for their use? Many States, too, recognize the safety factor in fire insurance by anti-discrimination laws which provide equal rates for all where equal safety features are existent; hence the adjustment department in the offices of the various State Insurance Commissioners.

A clear exposition of such differential rates will be

How Differential Rates Are Granted for the Introduction of the Safety Factor in Bank Burglary Insurance

Compiled by CONSTRVCTION, New York City, June, 1916.

Territorial Discount:

ZONE 1. New England and Middle States are considered the safest territory and allowed a discount on the base rate of	40%
Southern States	30%
Pacific Coast States	20%
Rocky Mountain Territory considered the most unsafe and allowed only	10%

Here zones are graduated according to general conditions of safety against burglary and differential rates (discounts) made accordingly.

Type of Safes and Vaults:

The construction of safes and vaults, from a standpoint of safety against burglary naturally receives serious consideration from the insurance companies in the form of differential rates as follows:

1. SAFES are classified *from* Class A, Fireproof-iron with concrete or other filling (without burglar-proof chest or steel lining); also coin safes or deposit boxes of light construction *to* Class H—All spherical and round and screw door safes—solid steel construction as distinguished from plate construction.
2. VAULTS are classified *from* Class 1—Fireproof, constructed of masonry, with fireproof door or doors; *to* Class 10, strictly modern vaults built since 1890, lined throughout with steel not less than 1½ inches in thickness and with one or more steel doors aggregating at least 9½ inches in thickness.

The following table shows the graduation of such rates:

SAFE CLASSIFICATIONS.

Vault Classification	A.	B.	C.	D.	E.	F.	G.	H.
1	$25.00	$16.00	$12.50	$11.25	$5.50	$4.50	$4.00	$3.00
2	16.00	14.50	11.50	10.25	5.00	4.00	3.60	2.70
3	13.00	12.50	9.50	8.75	4.40	3.60	3.20	2.40
4	6.10	5.50	4.50	4.00	3.70	3.00	2.70	2.00
5	5.50	4.95	4.00	3.60	3.35	2.70	2.40	1.80
6	4.60	4.15	3.35	3.00	2.80	2.25	2.00	1.50
7	3.85	3.40	2.80	2.50	2.35	1.90	1.65	1.25
9	3.00	2.70	2.25	2.00	1.90	1.50	1.35	1.00
8	2.40	2.15	1.80	1.60	1.50	1.20	1.00	.80
10	2.00	1.80	1.50	1.35	1.25	1.00	.85	.70

In the above TABLE:
The Numbers 1 to 10 designate the various Vault Classifications.
The Letters A to H designate the various Safe Classifications.

The rate applicable to any given safe contained in any given Vault is shown by the intersection of the vertical line under the proper safe of the horizontal line opposite the proper vault.

Note.—When a burglar-proof safe or vault door fails in any particular to come up to the standard required for any particular classification, the rate for the next inferior classification shall be applied.

Interior Daylight Robbery:

Flat rate subject to—
Population discount
Territorial discount

Day watch service in corridor	10%
Daytime burglar alarm to outside station	10%

Population Discount:

An interesting feature of differential rates granted for safety conditions is that of population discounts allowed as follows in consideration of an implied condition that the larger the town the better is the police protection:

1000 and 2000 population	10%
2000 " 2500 "	15%
2500 " 5000 "	20%
5000 " 10000 "	25%
10000 " 25000 "	35%
25000 " upward "	40%

Watchmen and alarm service discounts:

Outside registering on Watchman's Clock	5%
Outside signalling central station hourly	10%
Inside on duty all hours in which bank is closed	15%
Inside on duty all hours in which bank is closed—signalling central office hours	20%

Alarm System:

Alarm Attachment on windows and doors to signal central office	10%
Approved electric protection	40%

In spite of the fact that the same interests which compiled these rates are to-day engaged in plate glass insurance no consideration has been given to the subject of differential rates for the safe setting of plate glass.

How Differential Rates Favor the Factor of Safety in Life Insurance

Table Compiled by CONSTRVCTION, New York City, 1916

INDIVIDUAL INSURANCE

Physical Condition and Ancestry:

If condition is first class	Full insurance at regular rates.
If slightly sub-standard	Limited insurance at advanced premium.
Condition poor	Risk declined.

Note.—Ancestry has an important bearing on the safety element, and is seriously taken into account when considering risk.

Habits:

Must be such as are likely to conserve health.

Occupation:

Workers in powder mills, divers and those engaged in similar dangerous occupations	Risk declined.
Military and naval men and those engaged in activities which introduce hazards somewhat beyond normal	Differential Rates.

GROUP INSURANCE

Under this form of indemnity corporations or individuals employing large numbers of men are able to secure a blanket policy insuring each for a definite sum payable at death.

Structural Condition of Building:

Safeguards against fire, collapse, boiler explosions, panic.

Sanitation:

Rate is largely governed by existing conditions bearing on the health of employees.

Accident Protection:

Safety devices installed, voluntary and as required by law.
Equipment for treatment of injured.
Encouragement of the "Safety First" attitude on the part of employees.

Occupation:

Hazards peculiar to the business and safeguards against them.

Character of Employees:

Nationality.
Experience.
Order of intelligence.

This table shows that in every form of liability insurance differentials are made in favor of safety. Why not in favor of safety settings for plate glass?

found in the various tables shown on pages 13, 14, 15 and 16.

Co-ordinated Effort Necessary

Undoubtedly there should be a distinct co-ordinated effort on the part of those selfishly interested in securing differential rates for safely set plate glass. Those interested in the manufacture and sale of all the products used in the construction of store fronts, the manufacturers and jobbers of plate glass, the manufacturers of store fronts, the architects who specify them, and the contractors, plate glass distributors, and other agents who handle it, are the logical persons to get together and present their claims in an intelligent manner to the insurance companies.

There must certainly be a favorable response if this is done. Everyone stands to benefit—the architect, builder, property owner, the merchant and insurance and manufacturing interests alike.

Is Breakage Good Advertising?

It is impossible to believe that the insurance interests do not want to reduce breakage. It is not logical to believe that such breakage is considered in the favorable light of good advertising. Nor can the manufac-

How Differential Rates Are Granted for the Introduction of Safety Features in a Fire Insurance Exposure Table

Comparative Figures Compiled by CONSTRVCTION, New York City, 1916

EXPOSURES

RISK	Openings protected by wire glass in metal frames and standard fire shutters and doors				Protected by wire glass in metal frames or by standard shutters				Wooden sash and plain or plate glass			
	Front	Right	Rear	Left	Front	Right	Rear	Left	Front	Right	Rear	Left
Height... 8		5	2	2								
Rate... .225		1.60	.75	.40								
Distance	No exposure	adj.	35'	5'								
Adjoining:												
Party Wall												
Independent Wall												
Windows Over		yes										
Communicating												
Length of Side:												
A-Risk		60'	✓	65'								
B-Exposure		60'	40'	✓								
Tables Used		7-14	1	1								
BLANK WALL OF RISK towards exposure deduct ⅓ of charge. (*No deduction if wooden cornice or mansard.*)		.020 .136	.097	.076		.020 .136	.097	.076		020 .136	.097	.076
" " OF EXPOSURE towards risk, deduct ⅙.		.156				.156				.156		
" " TO BOTH deduct 90 per cent.												
OPENINGS NOT OPPOSITE each other deduct 30 per cent.												
" ON GRADE OR FIRST FLOOR ONLY, deduct 25 per cent.												
SHINGLE ROOF TO RISK increase charges 50 per cent. but not exceeding a sum which would make risk equal rate with exposure.												
LENGTH OF EXPOSED SIDE OF RISK.—Less than 75 running feet, 1 per cent. less for each foot. -15% *No deduction if adjoining with communication.* - 7½% - 17½% 10%		.023 .133		.008		.023 .133		.008		.023 .133		.008
" OF EXPOSURE.—Less than 75 feet, ⅙ per cent. less for each foot.		.009		.068		.009		.068		.009		.068
HEIGHT OF EXPOSURE.—If less than 5 stories deduct 15 per cent. for each story ~~less than 5~~. If over 5 stories and non-fireproof add 25 per cent. for each story over 5.		.124	.017			.124	.017			.124	.017	
-45% FALLING WALL HAZARD.—Add not less than 2 per cent. of the rate of the exposing risk.			.080				.080				.080	
GLASS FRONT OR SIDE OF RISK.—Increase charge 10 per cent. if first story, 20 per cent. for second, and 10 per cent. for each additional story.			.036	.031			.036	.031			.036	.031
" OF EXPOSURE.—Increase charge 20 per cent. for each glass story above first or grade floor.			.044	.037			.044	.037			.044	.037
STANDARD FIRE SHUTTERS or approved Wire Glass Windows.												
To window openings of risk..... 60% .40 per cent.		.074 .050	.026 .018	.022 .015		.050 .074	.018 .026	.015 .022				
If both.....60 " "												
To window openings of exposure.....33⅓ " "												
If both.....50 " "												
To risk and exposure.....45 " "												
If both.....67½ " "												
NOTE.—The allowance noted above for wire glass windows in addition to or without shutters, where exposure is within thirty feet of the risk; for overhead exposure, then for three stories or thirty feet above exposure, the wire glass windows must be of double glazed type. Beyond a distance of thirty feet, either horizontally or vertically, a single glazing is the equivalent of the standard shutter, but within that distance is entitled to only one-half the regular allowance. The increased allowance provided for under this rule where both standard shutters and approved wire glass windows are installed will not apply in those cases where the wire glass windows are single glazed, unless the exposure be more than thirty feet distant.												
NOTE.—Approved open sprinklers accepted as equal to standard fire shutters.												
LARGE AREA OF EXPOSURE exceeding 10,000 square feet and height exceeding intervening distance increase charge 20 per cent. and add a further 2 per cent. for each 1,000 in excess of 10,000.												
FRAME RISK increase charge 50 per cent. but not exceeding a sum which shall make rate of risk equal to 80 per cent. of exposure.												
IF BOTH RISK AND EXPOSURE RATES ARE BELOW 1 PER CENT.—Take such percentage of final result as the rate of risk bears to 1 per cent. *e. g.* if 65 cents, 65 per cent; if 45 cents, 45 per cent., etc.			.004	.004			.007	.006			.011	.009
Total Exposure Charge for all sides.		.050	.004	.004		.074	.007	.006		.124	.011	.009
HEIGHT OF RISK.—If under five stories high, deduct 15 per cent. of total charges for each story less than five. If over five stories high and non-fireproof add 15 per cent. for each story over five (not exceeding 75 per cent.) 8				.004 .050 .058				.007 .074 .087				.011 .124 .144
Deduct for Working margin 20 per cent.			20%	.012				.017				.029
THE EXPOSURE as computed under the table, shall be reduced as follows before being incorporated into the rate:—												
(*a*) By 18 per cent. in the case of the building for a risk rated on Non-fireproof Mercantile Schedule.	Building			.046				.070				.115
(*b*) By 30 per cent. in the case of the building, and 7½ per cent. in the case of the contents for risks rated on a non-fireproof schedule other than the Mercantile.			25%	.012				.018				.029
(*c*) By 65.6 per cent. in the case of fireproof buildings not rated on the Mercantile Schedule.	Contents			.034				.052				.086

(*d*) By 25 per cent. in the case of contents for all fireproof risks, subject to further deductions in conformity with the following table:—(as per F. P. E. M. Schedule).

IF POLICY covers only one or more floors not cut off 15 per cent.

If cut off the following table applies:—

Stock Distributed over	Wood doors	Non-Standard fire doors	Standard doors
2 floors	16⅔%	18⅓%	20%
3 "	18⅓%	21⅔%	25%
4 " or more	20 %	25 %	30%

(*e*) Risks rated on the Sprinkler Schedule shall, in the exposure charge receive a further allowance in addition to that produced under the application of the table, equal to one-half the percentage grading of the equipment. This additional allowance to be made before the exposure charge is incorporated in the rate.

Note: The above tables show clearly the lowering of the exposure rate of insurance by the proper use of standard forms of exterior opening protection. Table shows:

	Building	*Contents*
Wire glass, metal frames and standard shutters and doors......	.046	.034
Either of above with standard doors..........	.070	.052
Without protection	.115	.086

Safety Features Gain Rate Concessions in Workmen's Compensation Insurance

Compiled by CONSTRVCTION, New York City, June, 1916

Working from a basis schedule in workmen's compensation insurance, penalties and credits are applied to each risk according as it approaches to or departs from a standard property in its particular class. The three factors chiefly considered in the rating of risks are: 1st, liability to fire, collapse or boiler explosion; 2nd, the hazard incident to the industry, and 3rd, the extent to which all of the employees are subject to the occupational hazard.

From the schedule presented below will be noted the considerations entering into rate making.

SCHEDULE
RATING FORM

Buildings	Structural Conditions
Foundations	
Tanks on Roofs	
Floors	
Floor and wall Openings	
Hoistways	
Stairs	
Elevated Runways	
Boilers	Power Equipment Conditions.
Boiler and other Smokestacks	
Steam Engines	
Electrical Equipment	
Power Transmission	
Maintenance and Inspection	Safety Equipment and Conditions.
Protection against Fire Hazard	
Explosives	
Yards	
Grinding and Polishing Wheels	
Working Machine Hazard	
Safety and Welfare (first aid)	
Elevators	
Machine Operatives	
Safety Organization, etc.	
General Order, Light, etc.	

TOTALS

No. of Points to Equal One Cent
Chges. & Creds. expsd. in Dollars

turers of this product be possessed of the short-sighted and narrow-gauged policy that "the more glass breaks the more we sell." The truth is—the more glass is rendered safe from breakage, and this fact recognized by differential insurance rates, the more will the building and store-tenant public incline towards its increased use and toward the adoption of the modern arcade front, realizing that to increase show windows is to advance rentals and sales totals.

Developing "Backward" Retail Sections

The time is now at hand when the merchants and landlords of the country realize the advantage of the modern store front and the extent to which it beautifies the block in which it is placed. Not only that, but many landlords have been brought to realize, to their sorrow and expense, the losses sustained by holding on to old type of store fronts and seeing the retail sections of many American cities change, through the farsightedness of the up-to-date landlord and merchant who have gone into the "backward" retail section, and through their modern display windows have brought about a complete change in the retail business, completely to the demoralization of retail sections that have been established for years, but abandoned by retail buyers, who in all cases follow progressiveness.

Here we have one answer to the question "Why do the retail centers move?"

This spirit of modern construction is everywhere becoming more and more in evidence and is resulting in the use of from three to four times as much plate glass.

The Question of Insurance

Naturally the question of insurance becomes a strong factor and should receive the same consideration, in the matter of differential rates, as that shown in the tables in this article. Even as the element of safety is an important consideration in other lines of insurance, so should be encouraged the use of safety devices which would minimize the breakage of glass in the more modern types of store fronts; breakages which are not only unsightly when they occur but demoralizing to the victims of the breakage.

The Safe Setting of Plate Glass

That plate glass may be safely installed, the following conditions must be taken into consideration:

First, the framework in which the glass is placed should be substantial and erected in a careful manner.

Second, the members which support the glass in its settings should be imperishable.

Third, the inner-members or rabbet should be substantial and not subject to yield when subjected to screw pressure by the outer-member, which holds the glass in position; for, if the inner-member is yielding in any degree it will yield at the screw point of contact to a greater extent than at the points between the screws.

Further, when the glass is subjected to wind pressure at a slight angle the inner yielding or resilient member cannot yield uniformly, with the result that the glass is distorted, thereby causing breakage.

This principle will apply to any form of glass setting, whether wood, copper or iron, in the event that the inner-member is resilient.

Fourth, the method of holding a plate of glass safely in position should consist of slight indirect pressure without the application of screw driver, wrench or plier.

Fifth, holding a plate of glass in position by the outside molding when subjected to direct screw pressure, whether in wood, iron or copper, is dangerous, as it always results in having irregular pressure at the screw points of contact.

Sixth, all settings for plate glass, whether sash, corner or division bars, should be so constructed that the edges of the glass cannot come in contact with the metal and should be sufficiently substantial to resist wind pressure.

Seventh, the rabbet of the sash, corner or division bars should not be less than 5/8 of an inch wide, and the mechanical construction should be such that in the event of slight settling of the building, the glass can move in its setting to conform to the settlement of the building. This necessitates having the member which passes between the edges of the glass larger at the inner end than at the point which is in line with the edges of the glass.

Eighth, the use of a screw driver, pliers or wrench, should, if possible, be dispensed with in setting of plate glass, as the power exerted by means of these tools is in excess of the power that should be exerted in drawing to outer moulding, which holds the glass in position, into contact with the glass.

Ninth, when nails or screws are used in attaching the outer moulding to the framework which holds the glass in position they should be driven in a parallel line to the glass and not at right angles, as is the general custom. This principle should apply to all styles of construction, whether wood, iron or copper.

Tenth, all plate glass in show windows are set on two blocks; each block being placed about 14 inches from the ends of the plate. These blocks should be self adjusting.

When this glass is set on the blocks it must be kept away from the rabbet a sufficient distance to allow the withdrawal of the lifting straps. The glaziers, if they are not using self adjusting setting blocks, must lift the glass off the blocks by means of a pry so as to get it into contact with the rabbet at the points where it sets on the blocks. The weight and friction of a plate of glass are such that it will not slide on stationary blocks; it must, therefore, be lifted in order to move it into contact with the rabbet, but the glaziers frequently forget this part of the work owing to the labor and risk of breakage in lifting the glass off the blocks with a pry. The result is that the glass is not in contact with the rabbet at the points where it sets on the blocks, but is sprung into contact on both sides of the blocks when the outside molding, which holds the glass in position, is applied.

From this it is easy to understand how a plate of glass is distorted when not in contact with the rabbet at the points where it sets on stationary blocks.

Though this distortion may not crack the glass at the time, it puts it under a dangerous tension which may start a crack whenever a little stress occurs, such as wind pressure or vibration. With the self adjusting setting block this danger is done away with. The glazier sets the plate of glass on self adjusting blocks in the usual way and withdraw their straps.

The Advantages of the Modern Arcade Store Front

The modern idea in store front construction is to so design this front that the maximum of show window display space may be obtained.

The show window should be considered as a series of large show cases, which have the advantage of being located where the passerby will be attracted. A study of the psychology of window salesmanship will readily show that the prospective customer is first attracted by the display, if it consists of products in the purchase of which he is interested, and this attraction results in investigation—not investigation by immediately entering the store, but by studying and appraising the value and quality of the goods displayed and whether or not they fit in with his needs and desires. Here, then, is where the modern arcade front, with its long returns and recesses just off the street, is of distinct value.

In the first place it undoubtedly attracts attention.

The First Impression Counts!

The clean-out plate glass and metal front, properly lighted, and with attractive angles, showing a large display of merchandise, promises something of interest. This looks like a thriving business. The store front of this type stands out from its old-fashioned flat front neighbor, it looks new and up to date and there are convenient spaces into which to step and examine the goods at leisure and in comparative quiet. Immediately one is impressed with the fact that here is a comprehensive line of stock. The merchant next door or on the next block may have more goods in stock and a larger line—but how does the passer-by know this, as the goods in question are piled on the shelves in the rear of the store and in boxes and drawers along the side? It is the *first impression* that counts! Another point is that properly displayed goods often sell themselves.

The Silent Salesman

The average man or woman likes to look over merchandise that is offered for sale without listening to the importunities of sales persons or incurring the strongly-felt obligation of "buying something" if they enter a store. With the modern store front a large part of the stock can be displayed so that the prospective buyer has already made up his or her mind as to what is desired before entering the store. Again, how many of us have decided that we want something simply because we have seen it attractively displayed in a store window?

Benefitting the Merchant

The merchant who employs the modern arcade front has practically all the advantages of a store front twice or more the width of his store. He gets his goods out of the dark into the light and so their value passes out of inventory into the bank. With the arcade front, and its advantages of proper light angles, another dimension, that of depth, is added to the show window. Here prospective customers are led by interest halfway into the store. They absorb some of the spirit of the business and subconsciously feel the desire to do business with the merchant who carries such an attractive and comprehensive stock of goods.

Benefitting the Property Owner

To increase the rental income, and so increase the value of the property, is the aim of every progressive owner of store property. When a prospective tenant of a retail store looks for a location, he is immediately flooded with details of stores for rent—thanks to the ever-present and ever-hustling rental or real estate broker.

If the store in question has been designed with a modern arcade front, no person will be quicker to realize these advantages than the progressive merchant. The agent or broker will use these arguments with compelling force, because they are based on plain and simple truths and conditions; in fact, there is no doubt that higher rental can be obtained for a store with a modern front than for that which follows the old lines. Then there is much less chance of store vacancies, the loss in which must be deducted directly from the possible net income. When stores are vacant the taxes are not less, nor does the value of the property remain stable. How much easier it is to sell store property at a good figure when the stores are known to rent well!

No more striking example of this condition can be found than that of the large properties of an estate which are located on and near Broadway in New York City, not far from Forty-second street. Here is block after block of store property located where ground values are enormous. The owners will do absolutely nothing in the way of improving the old stores located on these properties and for this reason there exists block after block of old-fashioned untenanted stores in one of the busiest districts of New York. By spending a small sum of money on proper store fronts and proper up-keep of these buildings, the income could be doubled in one year.

Logical Improvement of Valuable Street Frontage

It seems logical to think that, where real estate is worth vast sums of money, as it is on the busy thoroughfares of large cities, more attention would be paid the subject of making the most out of the property which abuts directly upon the street. The value of this property lies particularly in the fact that thousands of people pass daily. Why, then, should the old-fashioned front continue to exist in such places? Why not take this valuable front and a few feet of the depth of the store, which is now being used for the purpose of hiding the stock, and by the use of proper design produce an arcade front which will mean three times the show window space?

Benefitting Communities

In the matter of the benefit to the community of the installation of modern arcade store fronts, an editorial which appeared in the *Public Ledger* (Philadelphia) on June 16, 1916, is so much to the point that it is reproduced here in its entirety:

> "FIRST IMPRESSIONS COUNT"
>
> "A visitor to Philadelphia the other day was heard to describe the city as 'hideous.' The term was used in explanation of her failure to do her shopping here instead of elsewhere. Zealous Philadelphians will be disposed to dispute the accuracy of her description of their city as 'hideous,' but whether there be justification for the employment of such a derogatory adjective or not, the incident conveys a lesson which Philadelphia property owners and tenants in the business section will do well to take to heart. First impressions, even if they be exaggerated, are often not only ineradicable, but are powerful to influence strangers, and if those first impressions are unfavorable the result will not be for the well-being of the city.
>
> "There have been vast improvements in the appearance of the principal retail shopping streets of Philadelphia in recent years, and many changes for the better are actually in progress at the present moment. But the significant thing, too often overlooked, is that the ugly store front or antiquated window display nullifies the effect of the modern building or the artistic exhibit of wares next door. If a merchant is content with accommodations which did well enough for his father or his grandfather, he cannot expect to be regarded as up-to-date; and if the owner of real estate is satisfied with the income yielded by the old-fashioned and unimproved property he will have no right to complain if business declines and rents with it.
>
> "Philadelphia may not deserve to be called 'hideous,' but its merchants ought to see to it that all doubt is removed by a systematic movement to get rid of the eyesores and to freshen up the forgotten corners."

Getting Rid of the Eyesores

To get rid of the eyesores and to freshen up the forgotten corners is mainly a matter of improving the store fronts. This reform is certainly not to be brought about for the sake of making the city "less hideous," but with a deeper motive behind it—the motive of selfish interest for the individual business and the general purpose of attracting trade along certain streets. Merchants and merchants' associations should not be slow in carefully studying this matter of modern store front construction, which, as the result of a small investment, will mean a large increase in revenue.

The Cost Question

One of the most important factors in the introduction of any type of safety device or safe practice in construction is that of cost. In a consideration of the advisability of using safe methods, there is usually a serious fault in the reasoning of the building public, and that is, to allow first cost to overshadow ultimate cost. This is a serious mistake and one which usually results in later losses which raise the actual cost to a prohibitive amount.

The arcade store front, requiring as it does from two to three times the amount of plate glass necessary for a front of the old style, and requiring also a safe imperishable metal setting, will cost a few hundred dollars more than the old type. To offset this cost, where proper safe settings are used, there is a reduced cost of maintenance in the matter of painting, and the indirect loss of breakage, and for this investment two or three times the amount of show window space can be obtained, at the same time producing a front which will catch the eye of the passer-by.

As to cost, the fact that doubtless within the near future the safe setting of plate glass will be recognized by differential insurance rates will be of distinct value to the owner in keeping down maintenance charges.

Realization and Action

A realization of the advantages to be derived by the use of the modern arcade store front; and the encouragement of the safe setting of plate glass by the granting of differential insurance rates, predicated on this factor of assured safety, will benefit every community in which store properties are located; every merchant whose business depends to a large extent on an attractive display of wares; and every property owner whose income is derived from store rentals.

Architect and property owner, merchant and manufacturer, plate glass insurance man as well as the jobber and contractor of the products of glass and metal which enter into the proper construction of store fronts should be interested in this subject, which appeals so strongly from the aesthetic standpoint; the standpoint of safety and decreased breakage, and from that of civic improvement, common sense, proper merchandising, and the increasing of property returns.

* * *

The introduction of the safety factor into all phases of commercial activity is a sound business principle

Reducing the Conflagration Hazard by the Use of Wire Glass

The following interesting statements, in regard to the use of wire glass in old and new buildings, were taken from a paper offered by Edward R. Hardy and Howard Chapman at a recent gathering of the New York Chapter of the National Fire Protection Association.—Editor.

LOCAL exposures are of two general classes, one where a lower building adjoins, with windows in exposed wall above; and the other where buildings are of similar height and separated by a light-well, alley or street.

The first case is usually the more severe in that the window may be over the fire and only a few feet above the roof of the burning building. Wire glass has stood the most severe practical tests of this nature. The temperature at such points is probably less than generally supposed. The air currents may be such as to more or less protect these windows from the excessive heat obtained near the center of the burning building.

The other class of local exposures, i.e., across alleys, is generally not as severe, and in several such cases wire glass has successfully stood the test. The windows of two buildings are seldom less than 10 feet apart and generally 15 to 20 feet at least. This gives plenty of room for air currents; and as regards wire glass, the seriousness of such exposures is greatly exaggerated. A 6 to 10-story brick building with combustible contents and window openings 10 to 20 feet distant would be considered a serious exposure. Wire glass has stood up against such exposures many, many times without failure, and yet we find the statement generally and authoritatively made that wire glass is only good for moderate exposures. The blowpipe continued flame effect used in laboratory tests to break down wire glass does not occur in even severe exposure fires, and while such a test may have value in determining the comparative merits of various windows, it is distinctly misleading when applied to practice.

Radiation of heat under conflagration is, of course, important, and the interior may be ignited and so cause an internal fire if there were no inside protection or aid given. As was exemplified in the San Francisco fire, the wire glass provides a barrier behind which one can fight with a good chance of success; and the possible weakness of radiation is present, to some extent at least, with other fire-retardants. We must also remember that to ignite combustible material in a building by radiation requires continued high temperature, which seldom occurs in practice, and, finally, the many advantages and general adaptability of wire glass must be recognized as offsetting any minor disadvantages when compared to other retardants.

The problem of window openings is of vital importance. There is only one general and satisfactory solution, namely, wire glass. The insurance interests are apt to be ultra-conservative, and, in this case, greatly to their detriment, for their attitude towards wire glass has not been liberal and has hindered its progress. We must seek the best there is and then make the most of it. It is not good engineering, nor good underwriting, to pay wire glass the backhanded compliment of saying it is acceptable for moderate exposures, when the facts clearly prove that it is the best for all exposures, internal as well as external.

The record of the standard wire glass window has been one of unbroken efficiency. It presents by far the best solution yet reached for the protection of vertical openings, for it can be used anywhere, and does not readily lose its original efficiency.

The fire loss affects everyone, owner and tenant alike. It is a subtle form of indirect taxation. It feeds on every form of business. It concerns every householder; and it is to the conflagration-hazard that all this is in such large measure due. The conflagration-hazard is not a local matter. It is present in this city and in every other town and city in the country.

Our buildings are what they are. They cannot be raised and the right kind substituted, and we shall continue to pay the piper until we take means to separate our risks. Perhaps the most feasible plan is that suggested by Mr. Wentworth of the National Fire Protection Association:

"In the principal center, or centres, of nearly every city, are streets crossing at right angles lined for greater or less distances with buildings of stone, brick or concrete. On the map these appear as crosses, separating the district into two quarters, and which would have the effect of serving as fire-stops if the buildings were properly equipped. Such buildings, however, are of no value, for their windows are of ordinary glass and the

(*Continued on page* 24)

Responsibilities of Business Men for a Decrease in the Fire Waste

By IRA G. HOAGLAND, NEW YORK

An address delivered at the 21st Annual Convention National Association of Credit Men, Pittsburgh, Pa.

RESPONSIBILITY for a decrease in the nation's fire waste is upon business men. Responsibility is the state of being accountable. The community should be accountable for the effect of the conditions it condones. As the business men are the creative element in the community and can specify what shall prevail, they are accountable for the character of conditions condoned, and, therefore, accountable for a decrease in the fire waste.

But the accountability of the community to its population and of the creative element therein to the community, is a civic safety cycle as yet practically unformed in this country. As it is, our ideas of responsibility for fires, sometimes, to say the least, are rather peculiar, that is, to those who are endeavoring to get at the real reasons of things.

How Conflagrations are Encouraged

A bad-mannered cow was held responsible for Chicago's conflagration. But the cow was not responsible for the lantern being where she could kick it over, nor for the delayed alarm and tardy response of the fire department, nor for the conditions Chicago permitted which favored the sweeping spread of the fire.

First reports of the recent dwelling-district conflagration in East Nashville, Tenn., made much of a story that the fire had been started by a blazing ball of yarn a little negro boy had kicked out of a house into dry grass. As a matter of fact the trouble began in combustible litter in the yard of a woodworking plant and a high wind showered sparks over acres of shingle roofs multiplying jobs for the fire department at such a rate that it was soon out-numbered. If Nashville, as a community, had required clean yards and incombustible roofs, 3,000 of its population would not have suffered the loss of their homes!

Baltimore's blaze began in the basement of a dry goods and notion house. Before the firemen could control it, the heat, ascending through an open elevator shaft, attacked celluloid goods stored in the top story, releasing inflammable gases, which exploded and blew off the top of the building. By the time the firemen hard at work below realized what the circumstances were a conflagration was underway over their devoted heads.

They were no surly-cow-brand stories exploited in connection with Baltimore's fire, but it was accounted for in many ways not strictly in accord with the facts. If Baltimore had required automatic sprinkler protection in mercantile buildings, where fires are not likely to be reached easily, as in basements, or where combustible commodities are stored, or had required elevator shafts, stairways, or other floor openings to be enclosed, or had restricted the storage of dangerous goods, the conditions would have been right for the successful control of the fire before it could have gotten out of hand, and there would not have been a Baltimore conflagration.

Salem's fire originated in an outbuilding of a tannery, where dangerous materials were being used, and at a very inopportune time—most of the fire department was "out to lunch." The flames found readily available fuel in the quick-burning wooden construction of the tannery building, and were beyond control by the time the fire department mustered its forces at the fray. *Sparks rained upon surrounding shingle roofs,* and very soon something big in the way of a conflagration was underway.

The flame which swept a great section of Augusta, Ga., originated in the first story of a "fire-trap" mercantile and office building; a nearby elevator shaft carried flames and smoke through the building in a few moments. Persons in the upper stories were cut off, as the stairway wound around the elevator shaft. The alarm was prompt, and the response, too—less than 2 minutes, but by the time the rescue work was over and everyone safely out of the building, and the firemen could mass their energies against the fire, a high wind was whipping flames down and across the street, and the battle was a losing one from the start.

Neither Salem nor Augusta had requirements, worthy of the name, for conditions necessary to the proper restraint of fire before their experiences, but it was different afterwards. Salem enacted stringent particulars to control the character of new construction. And Augusta did the very best thing possible by enacting as its building ordinance, before the ashes of the conflagration grew cold, the model building code of the National Board of Fire Underwriters. In doing so, Augusta acknowledged its accountability for the fire, and especially was it accountable for having ignored the warning of its fire chief about the very building in which the fire started.

"Getting" the Fire

A locked door was considered "responsible" for the fearful loss of life in the Triangle waist factory fire in a "fireproof" loft building in New York. As a matter of fact the fire was responsible, and, as it began and spread under obviously dangerous conditions, the community was responsible for the effect of the fire. An endeavor was made to fix the responsibility, but as the City of New York was not on trial it was not fixed.

The Triangle factory fire was a clear illustration of the mischief there is in the prevailing notion that exits are a greater assurance of safety than fire control, that to get away from the fire is more important than to "get" the fire before it gets away, that the only place of safety is outside buildings and not inside buildings. Fire department chiefs, fire prevention and insurance engineers, architects and others all concurred in the opinion that there would not have been a single loss of life in the Triangle fire had the building been equipped with automatic sprinklers.

Exits are important, to be sure, but in emphasizing exits and ignoring fire control, the community accounts meagerly for the safety of the population and virtually shifts the burden of responsibility to those it seeks to safeguard, for, after specifying what should be provided in the way of exits and enforcing the provisions, it considers its responsibility fulfilled, as also does the person who complies with the law; therefore, at the time of fire, the responsibility for safety is upon the shoulders of those who of their own volition must seek safety outside the building by ways specified by law, and woe betide the faint-hearted, weak-kneed and panic-stricken who do not find their way out, for the law does not often recognize the fact that fire can be controlled.

Last fall there occurred in Pittsburgh a distressing factory fire in which were lost the lives of a number of young women; distressing because the event was the result of conditions this community condoned, conditions which the veriest tyro in fire prevention engineering would know to be unsafe. The building was three stories high, with walls of brick and the interior construction of wood, arranged to favor quick burning, both in the disposition of the materials of construction and in the floor openings. The first story was occupied for the storage of hay, grain and feed; the second by a worker in metal, and the third by a paper-box maker, employing a number of girls. The fire occurred and the same results happened as have happened and always will happen where the fact that fire can be controlled is ignored. Had the building been equipped with automatic sprinklers which would have controlled the fire where it began, or had the fire been confined by a proper arrangement of the construction, the speedy response of the fire department would have counted for more than it did. Pittsburgh condoned the conditions in the Sandusky street factory and is answerable for the fatal results of the fire.

A Comparison of Fire Losses

Just how much need there is for an awakening of community responsibility is emphasized by this comparison. In 1913, in European cities, with an aggregate population of nearly 25,000,000, the per capita fire loss was only 37 cents, while in the United States during the same period the per capita fire loss was $2.25 in cities having a total population of about 33,000,000. In 1914, the per capita loss in 298 cities in the United States was $2.32. The 1915 figures show a per capita loss of $1.94 in 333 cities having an aggregate population of over 35,000,000. This decrease is encouraging, but the record for 1916, thus far, is not.

One of the most discouraging aspects of the whole fire question is the universal disregard of responsibility. If the country could only be aroused to the need for a decrease in the fire waste, aroused as it is over the question of preparedness for war, the sense of responsibility would be awakened. But there are hopeful signs—Pennsylvania supplies an inspiring example of aroused authority. This State has the distinction of being the first to enact a law enforcing personal responsibility for preventable fires.

Personal Responsibility Law

Pennsylvania's personal responsibility statute provides that in addition to present penalties for arson, or payment of fines and penalties for the violation of laws and ordinances, the person on whose property a fire occurs due to criminal intent, willful negligence, or failure to comply with the laws and ordinances, shall be liable to the municipality for the payment of all costs and expenses of the fire department in extinguishing the fire. These costs shall include the wages of the firemen, a reasonable amount of rental for the use of the apparatus, and the cost of the water and other materials used, with an additional amount of 10 per cent of the total as supervisory or overhead charges, to be paid into the city treasury.

A law of similar intent, except that it is more drastic and makes the person who has a fire liable for the damaged caused to his own and other property, is in force abroad and in the Latin republics on this continent. In New York, Chief Commissioner Adamson invoked an ancient law and succeeded in collecting the amount of the fire department cost for extinguishing a fire, where the fire prevention bureau orders for improvements had been disregarded. In an individual liability law a community has an excellent medium through which to delegate its responsibility to each and every citizen.

Other encouraging examples of aroused community authority, and particularly encouraging are they because the principle of fire control has been recognized, are to be found in New York, Chicago and in Massachusetts' Metropolitan District—Boston and surrounding communities. New York's fire commissioner is empowered to order automatic sprinklers installed in buildings where, in his judgment, this protection is needed. Chicago's fire prevention law specifically provides for sprinkler protection in many classes and kinds of buildings. Massachusetts' fire-hazard law requires this protection in buildings housing certain classes of occupancy which are likely to breed fires.

There are a number of things a community must do in order to give a full accounting of its responsibility to its public. Generally speaking, it must perfect all of the agencies of prevention and control of fire.

Preventing Fires

Fire prevention comprehends two things: The actual elimination of potential causes of fire, and the establishment of conditions that will, as far as possible, confine fires to localities of origin; in other words, retard the spread of flames.

Elimination of fire causes may be obtained by instructing the public how to avoid fires; by fire department inspection of premises to seek conditions that escape untrained eyes and that the careless and indifferent ignore; by restricting the use of inflammables and explosives; by governing the installation of heating and lighting services; and by restraining generally the hazardous conditions likely to cause fires.

The conditions that will confine fires to the locality of origin are: Restriction of floor areas; protection of stairway and elevator and other openings through which fire may spread; also, protection of metal structural supports which fire would weaken.

In the fight to control fires, there are four successive stages of effort: (1) discovery of the fire; (2) the fire alarm; (3) response to the alarm, and (4) action at the fire.

The fight to control fires is hard to win if action is delayed. Progressive fire departments have cut down the time of response to 2 minutes, but they are utterly unable to do anything about the fateful interval of time between the beginning of a fire and the receipt of the alarm. Modern fire alarm telegraph systems, motor fire apparatus and alert firemen have done about all that is humanly possible in the response and action factors of fire control, but the discovery and summons factors are beyond them.

The discovery and summons factors of fire control can be improved in two ways: Manually, by standard watchman's service; and, automatically, by automatic thermostatic fire alarm systems, and by automatic sprinklers. The automatic ways assure the greatest measure of improvement. The automatic fire alarm "discovers" a fire a few seconds after it begins and immediately transmits an alarm to the fire department—both operations being performed without human aid. This advances response many precious seconds. But the automatic sprinkler system does even more—it does the whole job from discovery to action, and incidentally—if arranged to do it—notifies the fire department that it is in action.

The agencies for preventing and controlling fires exist in every city ready for development and perfection, and what is lacking can be readily imported. The National Board of Fire Underwriters' Committee on Fire Prevention is prepared to tell more than 250 communities in this country what to do to give an accounting of their responsibility for a decrease in the fire waste.

The Occupancy License

An instrument very necessary to a continuously good effect of the application of laws and ordinances enacted to create conditions of safety against fire, is the occupancy license.

Such a license would prevent the occupancy of buildings for any purposes other than those originally intended until they were remodeled and refitted to comply with the provisions in the law relating to the intended new occupancy. For example: A dwelling house abandoned as such and rented for factory purposes would not be licensed for occupancy until all of the particulars in the laws and ordinances concerning factories had been complied with. Nor could a tenant, who would increase the fire hazard in a factory building, move in until necessary additional safeguards had been provided; nor could some tenants move in some places at all under the operation of an occupancy license law.

Powell Evans, a public-spirited manufacturer in Philadelphia, and who addressed you several years ago, is performing a valuable public service in promoting interest in the occupancy license. At the recent annual meeting of the National Fire Protection Association he proposed a resolution to the effect that it be the sense of that Association that "an annual or change of tenancy occupancy license be adopted by all fire prevention authorities."

In seconding the resolution Secretary Wentworth said that "if an annual occupancy license law had been in operation in Pittsburgh that paper-box factory fire horror would not have occurred."

What Business Men Can Do

We have considered at some length the question of community responsibility as an understanding of what is necessary to a proper realization of what is expected of business men. What is expected of business men in accounting for a decrease in the fire waste comprehends what they shall do first for themselves and then for the community.

What business men can do for themselves in this respect is an old story to most of you. Mr. Meek of your association and Secretary Wentworth of the National Fire Protection Association have traveled all over the country telling credit men what to do to be saved from fire. And your official organ teems with practical and helpful information. Many of you represent business men who are among the 50,000 that have conserved the wealth of the nation to the extent of $3,000,000,000 by protecting their properties from fire with automatic sprinklers. What business men can do for themselves is briefly this: To arrange, equip and care for their properties so that fires will be either prevented or confined and controlled where they begin. And this is necessary before business men can begin to talk to the community.

It has been asserted that business men, the creative element in a community, can specify what conditions shall prevail; therefore they are responsible for the character of conditions that exist, and, in consequence, are accountable for a decrease in the fire waste.

Business men can account for their responsibility to the community by seeing to it that proper conditions of safety are established and that the constituted authorities are doing all that is possible to decrease the fire waste—that they are doing what is being done in the best of other communities.

If in every city there were a few business men who would, after every fire, ask themselves these questions: "Has everything been done that can be done to prevent and control fire in this city?" and, "Have we ourselves done everything we can do to bring about proper conditions?" it would not be long before there would be a marked falling-off in losses. In other words, if business men would hold themselves personally accountable for what communities suffer from fires, they would go far in accounting for their fire waste responsibilities.

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Reducing the Conflagration Hazard by the Use of Wire. Glass

(*Continued from page* 20)

window frames are of wood. In Baltimore, San Francisco, and other conflagrations, fire attacked such buildings, breaking the glass, burning the window frames, and covering every story of these "fireproof" buildings into horizontal flues, feeding on the burning contents. Buildings having brick or stone walls are natural and proper fire-stops if the fire can be kept out of them. The cities that will mark these principal street intersections, and equip the buildings at these points with metal window frames and wire glass, will then have the equivalent of solid fire-walls, dividing the adjacent district into four sections. In cities of consequence this can be repeated as many times as the circumstances will permit. Extensive fires in cities are what bring up the yearly loss to its enormous figures, and such a plan as this would keep the hazard below the peak in the load. It is the most feasible plan of which I know, for it may be applied everywhere and the expense is not prohibitive. We must come in time to the provision of such window protection in all factory, commercial and office buildings, and then it will mean the practical absolution of the conflagration-hazard."

The late Edward Atkinson said in effect that the only people who could reduce the fire loss are the owners and occupants of buildings. The late Mr. Napoleon went considerably further and made the man on whose property fire occurred responsible for the loss occasioned.

We do not take kindly in this country to improvements that we are compelled to make by law, but if we can be shown that it was to our material interest we will act quicker than any other people in the world. So, if the campaign for better conditions be long and vigorous enough, improvements will come, because enough people will be convinced of their economy.

No successful concern can afford to have a fire. This is the basic proposition on which all recommendations for betterment must rest. In an honest fire there is no such thing as "loss fully covered by insurance." Indemnity may pay for the things that are readily replaced in the open market, but it does not pay for time lost, for orders lost, for customers diverted to rival concerns, for disorganization of working force, for the myriad of smaller things that follow in the wake of a serious fire. Once let people in general become convinced of what we know is true—that fire protection is a paying proposition—and the battle is won. It is a paying propsition, not because of reduced insurance rates, because, all things considered, it is cheaper to guard against fire than to run the risk of disaster. This proposition has been proven out to the limit in the organizations of textile and other mills, known as the factory mutuals. Organized originally for purposes of pure fire insurance, they have grown to be institutions for systematic study and installation of fire protection devices. And where vast amounts were formerly subscribed to pay fire losses, comparatively small sums are now asked for, and the major portion of this is spent, not in fire indemnity, but in further study of the protection problem. The result has been the changing of cotton spinning from one of the most hazardous to perhaps the safest of manufactures.

The Editor's Page

IN the busy hours of every day
We pause—
To analyze and weigh
A striking word, or deed, or
thought.

Is It a Laughing Matter?

THE other night the Editor rounded a corner in New York City just in time to see the first flames breaking out of the windows of a "Fireproof (?) Storage Warehouse." In ten minutes from the time the fire first started great sheets of flame were roaring upward against the wall of an adjoining apartment house and threatening the entire business block on the other side.

In the usual manner a large crowd gathered, jostling, pushing and scrambling to get near the flames. It took the combined efforts of a squad of policemen and several members of the National Guard to hold back the curious crowd in order that rapidly arriving fire-fighting apparatus could get into action. Owing to the altitude of that section of the city it took some time to get proper pressure for the fire streams, and before the fire could be put out at least $50,000 worth of damage had been done.

In the usual manner, too, the crowd commented on every point which occurred to them, but particularly were these comments unfavorable to the fire department—suggestions and unpleasant criticism were the order of the evening. The well-organized fire department was in no way at fault. Handicapped as they were by water conditions, the men went at the fire sensibly and accomplished their given work well.

Suddenly a peculiar occurrence took place. A slight explosion shook the building and a large part of the front fell out, followed by a burst of flame which brilliantly illuminated a sign painted on the upper part of the building. In the red glare the words stood out with startling distinctness, ABSOLUTELY FIREPROOF! Then, as the flames licked up the wall, the words were suddenly gone.

"Absolutely fireproof; isn't that funny?" said a young woman among the onlookers. And so the laughing comment spread throughout the crowd. *Laughing* comment—but after all, is it a laughing matter?

Why is the fire loss calmly accepted as a part of the national existence? Why does the public *laugh* at the simple paradox of a burning fireproof building? A fool laughs at *all* things because he knows nothing of all things. The American public laughs at this thing because it knows nothing about it! Logic says, then, that in the matter of fire losses the American public is a nation of fools—and logic is the companion of truth!

The real fault in the matter of that individual fire, as in most fires, lay in the construction and equipment of the building. Where was the automatic fire alarm, or the sprinkler system? Why was so much wood used in the construction of this building? And why were the owners or tenants *allowed to call it fireproof?*

The Government says that you cannot label articles of food in a misleading manner. Live newspapers are fighting against misleading advertising—all for the public welfare. Why not so in the matter of buildings which house all our industries and the activities of our existence? Is not the labeling of a firetrap as "fireproof" a greater crime than labeling oleomargerine "fresh butter"?

Here, then, is the greatest of all needed popular reforms. More loss is caused annually by unnecessary fires than by all the impure and adulterated foods and drugs sold in this country!

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Talk Fire Prevention!

SOME little time ago, so the story runs, a man, more or less of science, devised a most wonderful scheme for communicating with other planets. The scheme was simplicity itself—merely that at a given time every person in the world should shout, thus creating a vast volume of sound, which must attract the attention of the "man in the moon" and the "canal-diggers of Mars." Chronometers, set with regard to the time differentials, were distributed by the shipload, and as the time for the "loud shout" drew near the world was alive with curiosity. At last the great moment arrived and every person in the world, except a few deaf ones here and there, instead of shouting, listened to hear the terrible noise, believing that one voice more or less would make no difference. So the great scheme failed because of the failure of its units.

Herein lies a moral for those who are in any manner interested in fire prevention—and there are quite a few among our 100,000,000 Americans.

Those who are intelligently interested in this matter of reducing the annual fire waste, whether interested from a purely selfish standpoint or from that of public welfare, should realize that they constitute the leaven which is to make the masses rise against the fire tax. If *you* believe in fire prevention do not keep the belief to yourself or in your business life only. Let it become an interesting topic of conversation among those you come in contact with. Urge the necessity for safety against fire in the construction of new buildings and the remodeling of old.

Only by gaining the interest of the general public will the matter of safety against fire become a matter of course.

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Common-Sense Homebuilding and the Newspapers

THE interest with which many of the large nationally-known newspapers, such as the *New York Globe, Tribune, Detroit Free Press* and the *Philadelphia Record,* reprinted almost in its entirety the article "Common Sense Homebuilding," which appeared in the last (June) issue of Constrvction, is significant of the changing attitude of the American public toward the matter of fire losses.

In this article safe construction by the use of masonry exteriors and firesafe roofing was urged, and the message, through the newspapers, went to millions of readers.

The article referred to was the first of a long series to be published monthly on the subject of home building from the standpoint of common sense. Here will be discussed the locating and financing of the project; the dealings with architect and contractor; the actual construction of walls, floors, roofs, et cetera, and the equipment and furnishing of the home. Throughout this series will run the keynote of protection against fire, and it is hoped and believed that newspapers and other printed mediums throughout the country will make use of this series for the furtherance of knowledge in the matter of the planning and building of the homes of the common people.

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The "Wood Eternal" —and Fire!

ON page 50 of the present issue of this publication will be found a most interesting article which deals with the advertising methods employed by those interested in furthering the sale of wood for use in the construction of homes and other buildings.

The cue for the tone of this article has been taken from the *American Lumberman* and other kindred publications, which, in their efforts to disparage and ridicule the use of materials which cannot burn, and to lessen the effects of some of the truths set forth in Constrvction in regard to the fire hazard of wood in building construction, have resorted to undignified badinage and to the employment of specious arguments and distorted statistics.

Constrvction, in its editorial columns, has ever held to a simple and dignified style of setting forth *facts* and plain figures in regard to fire losses. That the lumber interests have been somewhat disturbed by the stinging truth is to have been expected; but that their publicity organs should rush out in the manner of little boys stung when robbing a bee tree and resort to the most undignified of editorials was *not* expected.

Of course, as the truth of the relation of wood to the great unnecessary fire loss is bared and a profitable market for lumber slips slowly away, those selfishly interested are quite liable to become somewhat hysterical—but why sacrifice dignity to hot haste? This is not the age of the old English pamphleteers; nor should it be the age of vindictiveness in trade competition! Lumber will never gain anything by decrying the "substitutes," materials which are fire-retardant and unburnable. We do not say keep *all* wood out of the home—no! We say keep it off the outside of the home!

We all admit that wood is inherently inflammable. Then why make foolish claims for it? The public will not always accept destructive fires as part of the national existence.

How much better it would be to take the great sums of money which are being spent annually to force an unnatural market for the extensive use of wood in building construction and devote that money to setting forth safer uses of wood. CONSTRVCTION is not fighting against *wood,* but rather against the wrongful and dangerous use of wood for exteriors and roofs of houses, and for doors, trim, floors and window frames and sash, which render the so-called fireproof buildings veritable furnaces for the destruction of contents!

The application of the forces of dignity and introspection would undoubtedly be of great assistance in the matter of properly directing the activities of the restless lumber interests.

Clear evidence of the fact that we are not here assuming an unfair or untruthful position is plainly evidenced by the attitude of the more broad-minded and far-visioned of the lumbermen, who, seeing the "handwriting on the wall," are urging against the useless and wasteful expenditures of time and money to fight fireproofing materials. An article on page 33, quoting extracts from a letter directed by a well-known lumberman to a lumber association, will prove interesting in this connection.

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Cleanliness the Most Simple Form of Fire Prevention

IT is no uncommon experience to pick up the morning paper and read a brief notice of several fires which have started in a pile of rubbish or shavings or waste paper. Some of our greatest conflagrations have originated from this source. There are, of course, many businesses in the course of which considerable inflammable waste matter accumulates during the day, and as such waste accumulations present a serious fire-hazard, care should be taken that this waste is properly disposed of in safe waste cans or bins instead of being piled up for baling or other purposes.

Here is the most simple form of fire prevention—cleanliness. Many of our cities have instituted "clean-up day," during which householders are expected to clean out the forgotten corners of cellars, attics and storage rooms, thus getting rid of rubbish which is useless and dangerous in that it provides a menace both from the standpoint of the fire-hazard and from that of sanitation. This is a most excellent idea when properly carried out, having, as it undoubtedly does, an educational influence on the general public.

Sparks, from chimneys or from stacks of locomotives, are considered a serious fire menace, and have been responsible for the loss of millions of dollars' worth of property; but the real menace is constituted of the unguarded inflammable material to which these sparks may be carried. Many industrial plants, located near railroad tracks, have, at this very moment, large piles of inflammable waste exposed in such a manner as to invite the attack of fire. Many homes in this country have stacks of old paper piled up in the cellar. Get rid of it!

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Construction of Dwelling Houses

Need for Fire Stopping, and Suitable Materials for Use in Such Connection

IN the June number of CONSTRVCTION we noted the then recent issuance by the National Board of Fire Underwriters of its admirable Code of Suggestions for the proper construction of Dwelling Houses, and quoted at length therefrom the "reasons why dwellings burn freely and the remedy."

The question of fire-stopping in houses and the proper materials to be used in such connection are dealt with in the code in the following language:

1. No one feature of house construction will contribute more to its safety in case of fire than efficient, well placed fire-stops. Their purpose is to delay the spread of fire and so assist in confining it to the story in which it starts. This protects life and affords a better chance of extinguishing the fire.

2. Fire-stops are principally applicable to non-fireproof buildings, such as Types III and IV, though they should be used in any type of building where openings exist, which would act as flues to distribute heated air or gases from a fire in one part of a building to other portions, where they might ignite combustible material. The added cost of such protection is very slight, and yet its value is so little appreciated the ordinary dwelling either has no fire-stopping at all, or else the work is so indifferently done as to be practically worthless. Because such work does not show when a building is completed, and because its importance is usually entirely underestimated, it is common to delegate it to a boy, or some careless, incompetent person. The result is that the fire-stop is so in name only; it being merely a delusive imitation which, if called upon to fulfill its purpose, fails completely. Such work does not call for any high degree of mechanical skill, but it is absolutely necessary that it be done by an intelligent, conscientious workman if it is to be efficient.

3. The danger resulting from careless workmanship is greater in the construction of wooden fire-stops than when incombustible material is used. The reason for this is, that as the spaces between studs and joists vary somewhat, and as odd ends of timber are used for the purpose, it often happens that the opening supposed to be filled is really not completely closed. There will be a space of ¼ to ½ inch, due to a stop-piece happening. to be that much short of the correct length, but which is considered "good enough" for the purpose. Another cause for openings at the ends, is that if the end of a stop-piece is not square, a careless person will consider it too much trouble to saw it to fit; or a stud or joist may be warped, or not set squarely, and unless the stop-piece is carefully fitted an opening will be left. The same defects exist at the sides of the stop-pieces, and as all such joints are sure to widen somewhat due to shrinkage, it is extremely important that such fire-stopping be snugly fitted. If wooden fire stopping be used for walls or partitions, an intermediate stop shall be placed between the studs midway between floor and ceiling.

4. Incombustible fire-stopping material, such as mineral wool, concrete, or mortar, is soft when used, and is more or less tamped or pressed into space prepared for it. This usually forms tight joints on all sides, even though the work be indifferently done. Material similar to mineral wool which is packed in place and does not harden will have a tendency to expand and fill any space that may later be formed by the shrinkage of the timber, which is an advantage. The necessity for having tight joints is to prevent the passage of air or gases which have been heated to the point of combustion. See Note 1, Section 49, par. 2.

5. For reasons already explained, it is urged that incombustible fire-stopping materials be employed wherever possible. Their use not only lessens the chances of defective workmanshp, but as they are unburnable themselves, the possibility of a fire getting by them is considerably decreased. There are places, however, where wooden fire-stopping is permissible. These will be discussed later.

Fire Stopping Materials

6. There is a variety of materials which make excellent fire-stopping, such as brickwork, stone or cinder concrete, gypsum block, mineral wool or any incombustible material which, when packed into a space, will form a united mass that will not fall out through holes that might be made in the woodwork supporting it. Strips of metal lath can often be advantageously used to hold mortar or plaster until it sets. Some of these materials are nearly always found as waste products about a new building; their use involves no expense except for labor, and the disposal of refuse is an advantage.

7. When fire-stopping is made of brickwork, almost any sort of bricks will serve the purpose, such as second-hand, under-burned, chipped, broken or other de-

fectives, providing sufficient mortar be used to fill all joints and interstices.

NOTE.—As wooden studs are only about 3⅝ inches wide, the spaces between them are not wide enough for ordinary brick to be laid flatwise. Therefore, in fire-stopping a stud wall it will be necessary to lay the brick on edge on the inner line of the fire-stop and fill the space between the brick and sheathing with mortar; or use some other incombustible material. When fire-stopping a partition resting on a girder or the cap of a partition below, the bricks can be laid flatwise up nearly to the floor level, and then be laid edgewise with sufficient mortar on the side or sides to fill the space in the partition.

8. Concrete or mortar fill for fire-stopping can be made from any refuse from plaster, masonry or concrete work. Even if such material has set it can often be broken up, and by adding sufficient fine material to fill voids, enough cement or lime to produce a set, and water sufficient to form a plastic mass, it will make a very satisfactory fire-stopping material. Cinder concrete is also good.

9. Mineral wool is a superior material for fire-stopping. As previously explained it is especially adapted for places where it is necessary for the stopping to yield as the timbers shrink; also in places where its light weight is advantageous.

10. Solid gypsum blocks are excellent for fire-stopping in dry locations. They can be purchased the correct size to fit between studs, or ordinary partition blocks can easily be sawed to fit any space. It is important that any loose joints in such material should be filled with mortar. Such blocks will also yield when wood shrinks and throws pressure upon them.

NOTE.—Gypsum products, such as gypsum blocks, or so-called "plaster blocks" or "cinder plaster blocks," also plaster board, absorb moisture freely, and when wet they lose considerable of their strength. They should not be used in contact with wet surfaces, or where likely to become water soaked. Fire-stopping which remains damp is liable to induce dry rot in adjoining woodwork. Gypsum products are also liable to deteriorate when subjected to temperatures in excess of 200 degrees Fahr. for considerable periods of time. They should not be used where such unusual temperatures prevail.

11. Asbestos mill board, gypsum plaster board, or metal lath and plaster, are useful fire-stopping materials where considerable areas must be covered, such as a cellar ceiling or as the lining of the pocket for a sliding door. They are not recommended for the ordinary stopping of walls or partitions.

12. Aside from its great value in resisting the spread of fire, incombustible fire-stopping serves the very useful purpose of preventing the travel of rats or mice through a house, and aids in resisting the transmission of sounds.

Construction of Fire-Stopping

1. Fire-stopping shall be arranged to cut off all concealed draft openings, and form an effectual horizontal fire barrier between stories. Open passage in frame walls or partitions are a prolific cause for rapid spread of fire to all parts of a structure. If fire occurs in the cellar or basement, they act as flues to carry it to the attic. If the fire starts in the attic the sparks fall down the hollow spaces. Results are disastrous in either case.

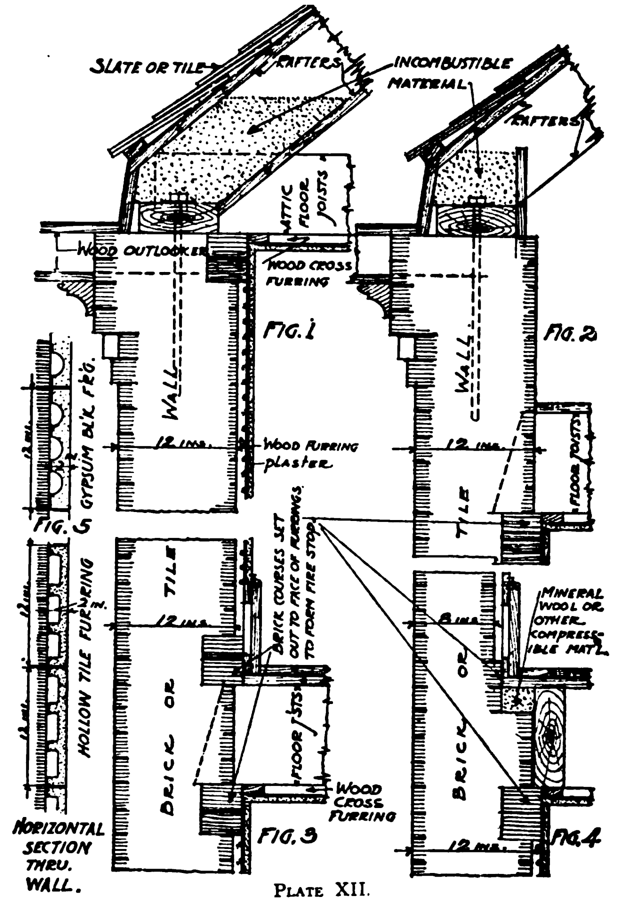

PLATE XII.

DWELLINGS WITH WALLS OF BRICK OR OTHER MASONRY.

Fig. 1.—Method of fire-stopping at eaves when attic floor joists are level with plate.

Fig. 2.—Same as Fig. 1, except that attic floor joists are any distance below the plate and built into the wall. Support for fire-stopping might be same as in Fig. 1 if more convenient.

Fig. 3.—In this and the other figures of this plate note fire-stopping of wooden furring by two courses of brickwork being set out to face of furring above and below floor joists all around the building. Other types of masonry walls should be built out in the same manner.

Fig. 4.—Fire-stopping at a floor level when the wall is thinner above the floor than below.

Fig. 5.—Terra cotta and gypsum block wall furring.

NOTE.—The first course above each floor shall either be solid blocks or the hollow spaces be filled with mortar.

2. *Furred Walls.* For all walls furred with wood the masonry between the ends of wooden beams shall project the thickness of the furring beyond the inner face of the wall for the full depth of the beams; or a double course of bricks or other masonry above and below the beams shall project beyond the face of the wall the full thickness of the furring. Plate XII. Such fire-stopping or hollow block walls is usually obtained by using 1-inch slabs of the same material, the slabs serving also as the bearing course for the floor joists. Where floor beams are parallel to a wall furred with wood, there shall be a space of not less than 2½ inches between such wall and the nearest beam. This space shall be filled in solidly with brickwork or concrete for the full depth of the floor beams, or be equivalent fire-stopped.

NOTE.—Two courses of bricks, slabs, or other masonry, are required to cut off a furring space, for mortar joints may drop out of a single course and render it useless.

Incombustible furring is excellent, since it entirely prevents a fire creeping along a wall from one story to another behind the plaster. Terra cotta or gypsum furring blocks or tile are much used and are quite satisfactory. They have a series of grooves in the back face which affords the necessary air space between the wall and the plaster. Plate XII, Figs. 4 and 5. There are also several styles of metal furring strips to which metal lath is attached, and so serve the same purpose. Where walls are likely to be damp, terra cotta furring would probably be most satisfactory. All these forms of furring should be fire-stopped with mortar a few inches at the bottom to prevent possibility of their acting as flues for heated gases and bringing them in contact with wooden construction in the floor above.

3. *Walls Studded-Off.* Where walls are studded-off, the space between the inside face of the wall and the studding at the floor level shall be fire-stopped with incombustible material. The beams directly over the studded-off space shall be deadened with not less than 4 inches of incombustible material, which shall be laid on boards cut in between the beams; or better still, use 4-inch solid gypsum plaster blocks cut to fit the space between the beams and supported by cleats, thus avoiding the board supports. The under side of such beams shall be protected by a covering of metal lath or plaster board, and plastered to a total thickness of ¾ inch, or a double layer of ¼-inch asbestos mill board with broken joints.

4. *Frame Walls.* In frame buildings, which are to be lathed and plastered or otherwise sheathed on the inside, all stud walls shall be completely fire-stopped with brickwork or other suitable incombustible material at each floor level. The spaces between the studs shall be filled to a height of 4 inches above the floor level. Plates XIII and XIV. For protection of frame walls with severe exterior exposure, see Section 58.

5. *Partitions.* Where stud partitions rest directly over each other and cross wooden floor beams at any angle, they shall run down between the floor beams and rest on the top plate of the partition below, and shall have the spaces between the studding filled in solid to at least 4 inches above each floor level with approved incombustible materials.

Methods for fire-stopping various forms of partition construction are shown in Plates XIII and XV. While incbombustible material only is recommended for fire-stopping, it may not always be practical to require it; therefore, in some cases the sketches indicate methods for placing both incombustible and wooden fire-stopping, but incombustible material should be used wherever suitable.

There are some places in wooden construction, such as a fire-stop along the top of a brick partition over which a floor is laid in the story above, see Plate XIII, Fige. 2 and 5, where wooden fire-stopping, or a compressible incombustible material, such as mineral wool, must be used, otherwise the shrinkage of the timber construction will, in time, cause the floor to bulge. A course of brickwork resting on the foundation wall and built between the ends of joists, is a method of fire-stopping frequently recommended as an addition to a wall-stop such as shown in Plate XIII, Figs. 1 and 3. Such brickwork, if built snugly against the underside of the floor, as it should be, is likely to deform the floor when the timber shrinks. If the wall stopping is effectively done with incombustible material, it is doubtful whether such secondary stop is necessary.

If the location is dry, and an additional fire-stop is desired, gypsum partition block would serve the purpose well, or it may be made of asbestos board or metal lath and plaster might be used. A wooden board could be used, but is not so good as incombustible material. Such a stop in an existing building in which the timber had practically ceased to shrink could be constructed of brickwork without objection.

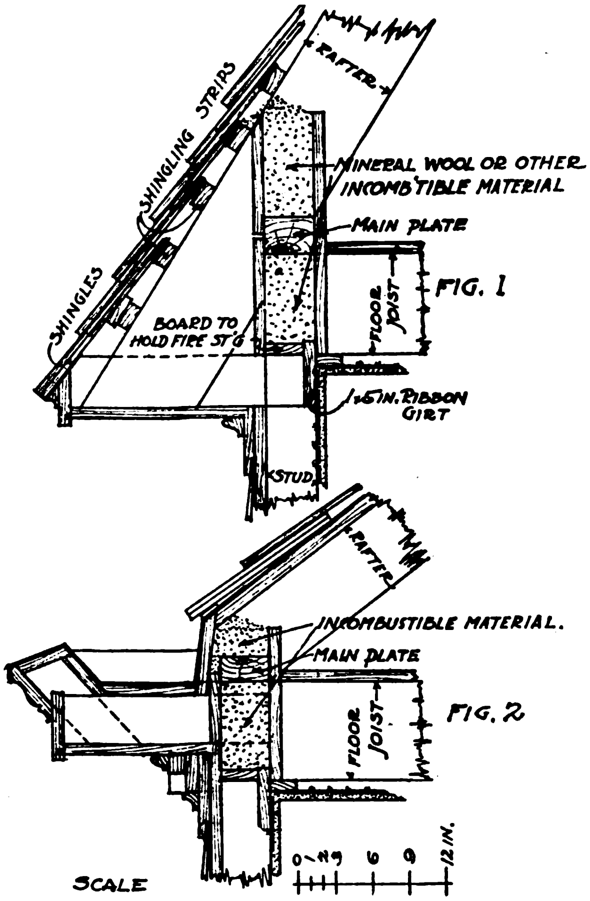

Plate XVII.

Fig. 1.—Connection of floor joists with outside "balloon" frame. Method of fire-stopping cornice and "gambrel" roof construction.

Fig. 2.—Connection of floor joists with outside "balloon" frame at plate level, showing "box" cornice, gutter trough, and foot of roof rafters, and method of fire-stopping. This retards fire entering building if cornice burns. Same methods employed for girt framing.

6. *Floors.* See Section 38, paragraphs 2 to 8 inclusive.

The Exposure Hazard

7. *Roofs.* Dwellings within 10 feet of other non-fireproof buildings, shall have the walls behind eaves

or cornices fully fire-stopped to prevent fire from a nearby building breaking through into the attic space. Such fire-stopping will also protect against fire which might lap under the eaves through the windows from a fire within. Plates XVI and XVII.

NOTE.—The most vulnerable point of attack for an exposure fire of this kind is under the eaves, for the heat banks up there and the woodwork is always highly combustible since never exposed to storms. With ordinary construction numerous cracks are almost certain to exist alongside the rafters communicating directly with the attic space which is usually difficult of access and liable to be filled with combustible material. It is, therefore, important that the space above the plate and between the rafters be filled as tight as possible. Where masonry walls are used they should extend up to the underside of the roof boards, or be fire-stopped as indicated.

8. *Cornices and Gutter.* Combustible cornices are always troublesome in case of fire. They catch fire easily, are usually dry and so burn freely, and a fire travels through them rapidly. Incombustible cornices are safest. Even though the framework be of wood, it is wise to cover the exterior surface with incombustible material where practical. Metal lath and cement plaster or stucco could be used on flat surfaces on underside of cornices.

Cornices built of wood or having wooden frames on rows of buildings, shall be either fully fire-stopped between each building, or shall be completely separated. Plate XVIII.

NOTE.—It is a common occurrence for a fire in a row of dwellings to communicate to several buildings through the cornice; it is much safer to make them entirely independent and it is so recommended.

9. *Piazzas.* It is important that stud walls back of or over piazzas, should be fully fire-stopped in manner indicated in Plate XIX.

NOTE. Fire Chiefs report that fire from a burning piazza is frequently carried through stud walls to the attic or upper story of a house and become the cause of complete destruction of the building, which otherwise might have been saved.

10. *Sliding Doors.* When sliding doors are pocketed in partitions, such pockets should be completely fire-stopped at sides, top and bottom. Asbestos mill board or plaster board is suited to this use. Plate XX.

11. *Wainscoting.* The surface of the walls or partitions behind wooden wainscoting and dados, shall be plastered flush with the grounds and down to the floor line. The same stopping shall be placed behind all applied wooden trim, such as fancy wooden paneling.

12. *Stairs.* The space between stair carriages shall be fire-stopped by a header beam at top and bottom. Where a stair run is not all in one room, or where a closet is located beneath the stairs, the stair carriages should have an intermediate fire-stop, so located as to cut off communication between portions of the stairs in different rooms, or between the closet and the room in which it is placed. Such stops can best be made of plank.

If a flight of stairs is so arranged as to be the only construction separating two stories at the place where they are located, as for example between the cellar and the story above, the underside of the stairs should be covered with metal lath or ½-inch plaster board, and plastered to a total thickness of ¾ inch.

NOTE.—Cellar stairs properly enclosed as specified in Section 37, par. 5, are very much safer than when protected by the method above described.

13. *Ducts and Chases.* Ducts, chases, or shafts for pipes, wires, speaking tubes, and for similar purposes, shall be fire-stopped at each floor with mortar or other incombustible material so as to form tight joints.

14. *Water, Gas and Plumbing Pipes.* All exposed pipes passing through any floor or wall shall have the surrounding air space closed off at the ceiling and the floor line, or on each side of the wall by close fitting metal caps. Wherever possible they should be surrounded by mortar or other close fitting incombustible material which does not conduct heat like metal. In fireproof construction it is preferable to have the pipes or shafts fit neat in the floor or wall. For protection around steam and hot water pipes, see Section 49.

Heating Systems

15. *Hot Air Pipes and Registers.* Where a furnace hot air pipe passes through a floor, the space between the pipe and floor construction shall be filled with incombustible material supported by sheet metal or metal lath. A light porous material, such as mineral wool, is best suited to the purpose. Plate XXI, Fig. 3.

The space between the register box set in a floor and the casing protecting the floor construction, shall be filled with similar incombustible material. This shall include the space around that portion of the hot air pipe attached to the register box down to the bottom of the joists in wooden floor construction, and a layer of sheet metal shall surround the pipe and be securely nailed to the underside of the joists to support the fire-stopping. When a register box is fire-stopped in this manner, the space between the box and the casing may be reduced to 2 inches; otherwise it should be 4 inches as specified by Section 48, par. 8. If the ceiling has a protective covering as elsewhere recommended, it should be made to cover the space and surround the pipe. Plate XXI, Fig. 2. When a space of 4 inches is provided on all sides of a floor register box, and the surrounding woodwork is encased in metal, the fire-stopping might be omitted provided the cellar or furnace room ceiling be completely protected by a covering at least equal to the minimum grade specified in Section 38, and that this covering fits snugly around the pipe connection as indicated in Plate XXI, Fig. 1. The fire-stopping would be more positive if the space were filled, and this is recommended wherever possible to obtain it.

When a register is connected to a brick hot air shaft, the space required between the outside of the shaft and the wooden floor construction shall be fire-stopped in like manner.

NOTE.—This fire-stopping is important, but seldom done.

Any such space should be fire-stopped irrespective of floor construction. In fireproof floor construction, register boxes should fit the floor opening snugly, and so make fire-stopping unnecessary. The protection of woodwork as elsewhere required around a register, will safeguard the wood from the heat of the pipe itself, but the open space provided around the pipe and register box forms an easy entrance for fire occurring in the lower story to gain access to the story which the register serves. The hot air pipe and its connection will get red hot and communicate fire to combustibles surrounding the register face, such as parquet floors, carpets, rugs and furniture. If the register box has soldered joints they will open, and a passageway for flame be formed. It is futile to enclose stairways and protect ceilings as elsewhere provided unless all other openings such as these are adequately closed.

The greatest hazard is in the cellar or basement where the furnace is located. There is an additional danger from the hot air pipes themselves. Such pipes leading from the furnace, if not protected would, in case of fire, become intensely hot and burn the dust which invariably accumulates in such devices, thus making a flash fire, and there would be great danger of the fire being communicated to the floor above, even though the pipes and registers were fire-stopped at the floor openings. For this reason the pipes, and the furnace itself, should be fully covered with cellular asbestos, or equivalent incombustible material at least ½ inch thick for the pipes, and 1 inch for the furnace. Such covering is inexpensive, and reduces coal bills by conserving the furnace heat. It is much used for this purpose alone. The covering is manufactured for the purpose, and sold in rolls. It is ¼ inch thick, and should be used in double layers with broken joints. Suitable metal bands to hold it in place are supplied.

It is common practice to simply cover hot air pipes with a sheet of thin asbestos paper pasted to the pipe. Such protection is merely a pretense. It may have a little value as a heat insulator, but has practically none as a fire-resistant. It deserves no consideration.

16. *Chimneys.* See Section 41, par. 20, and Section 42, par. 2.

17. No fire-stopping should be in any manner concealed from view until opportunity has been given the owner or his representative to inspect same. This is particularly important when work is done under contract.

18. Although it would not be practicable to fire-stop an existing house as completely as here recommended for new construction, nevertheless it would be quite feasible to apply several of the suggestions to any existing house in which such barriers had been omitted, and would materially lessen the fire risk.

NOTE.—The great obstacle in securing efficient fire-stops in a building, is in getting architects and builders to realize the supreme importance of such precautions. The ordinary carpenter or builder has an inherent prejudice against doing work which does not visibly advance his contract. Ignorant of the serious annual life and property loss due to fires in combustible dwellings, he considers the possibility of such a fire too remote to worry about, and the general experience is that he will not put in proper fire-stops unless very carefully watched. Someone must be responsible for rigid inspection to insure that such work is conscientiously performed. Usually the owner lacks experience, and does not know what should be required. It is hoped these explanations may be of assistance.

Plans are being prepared for the $150,000 building which the Baptist Woman's Missionary Union Training School intends erecting at Louisville, Ky. The structure will be three stories and basement, and of Gothic design. Captain Brinton B. Davis is the architect.

Menaced by Frame Construction and Wooden Roofs

RESIDENTS of Somerville, Mass., have good cause to fear the conflagration hazard, and when the expected fire does take place it's a safe assumption that there will be little left but a mass of ruins to mark the site of the historic city; that is, unless the authorities, spurred to action by forcefully expressed public opinion, make prompt and adequate provision for meeting the situation.

As pointed out by the engineers of the National Board of Fire Underwriters, the combination of excessive frame construction; a preponderance of wood shingle roofs and weak protective facilities render the conflagration hazard at Somerville unusually severe.

In part the engineers say:

"The predominating feature of the conflagration hazard is the practically continuous frame construction throughout the city, with few vacant areas to retard the spread of fire. Streets are mainly narrow; many in residential districts are but 40 feet wide and few are over 60 feet in width. Two railroad rights of way that extend through the centre of the city form moderate fire breaks, but would be of little value in a general conflagration. The construction is mainly 2 or 2½ story detached frame shingle roofed dwellings or 3 story frame flats. A few of the dwellings and flats are in pairs, sometimes separated by a brick or brick-filled wall; some are in frame rows, generally not cut off. More than one-half of the houses have shingled roofs. Building lots are mainly 40 feet or less in width, and the distance between dwellings, measured along the street fronts, averages about 12 feet, with many more closely spaced. The lots are mostly shallow; average depth is about 85 to 90 feet, bringing the rears of dwelling to within 70 to 80 feet of each other, which, with the numerous frame stables and garages between, results in a direct rear exposure. The city is surrounded on practically all sides with frame buildings of much the same character, which offer quite serious exposures.

"The whole city presents the normally severe hazard of frame residential districts, with many wooden shingle roofs, increased by the close grouping of buildings, by frequent high winds, a fire department weak in men and engine capacity and a water distribution system which could not supply sufficient quantities for serious fires originating at certain points. Long experience has proven that where such conditions obtain, the conflagration hazard is severe, and only the proper combination of adverse circumstances is required to produce a sweeping disastrous fire.'

To replace its plant recently burned the Chesbrough-Moss Company, wholesale grocers, of Beloit, Wis., intend erecting a "fireproof brick building" and are having plans drawn to that end.

FRAME DWELLINGS AS CONFLAGRATION BREEDERS

A BUSINESS organization that among its other activities gives intelligent attention to the great fire waste of the country, and is ever alert to assist in means toward its reduction, is the National Association of Credit Men. At the recently held annual gathering of the association, one of the standing committees reported as follows:

"If it were not for the fact that the ordinary dwelling house has proved again and again a conflagration breeder, this class of risk would not fall within the purview of the fire insurance committee of our association; but in nearly all the conflagrations of late years it has been found that the great feeder of conflagration is the ordinary dwelling house, largely because of the construction of its roof. So serious was the part played by the shingled-roof dwelling in the conflagrations of the early spring in Paris, Tex., Nashville, Tenn., and Augusta, Ga., that your committee feels that it is of the highest importance that the committee of the next year take cognizance of the dwelling house hazard, and join with the National Board of Fire Underwriters and National Fire Protection Association in securing the adoption in various cities of the country of a new code for the construction and fire protection of dwelling houses, particularly as applying to the untreated shingled roof. Quite a number of the cities of the country have enacted ordinances requiring the use of fire-resisting roofings within the city limits, but the majority of them are those cities which, because of the visitation of the fire fiend, have been made to recognize the necessity. It surely ought not to be necessary for the other cities of the country to be impressed in the same way with the hazard of the untreated shingled roof.

"Finally, the following resolutions are offered:

Resolved, That we here reaffirm the resolutions adopted at previous conventions calling for the appointment by our local associations of fire insurance committees, it being the conviction of this association that the credit men of the country should carry on systematically, and as a regular part of association work, the study of conditions in their respective communities with reference to the fire hazard, and interest themselves in the improving of building codes and regulations in their cities, demand such protective agencies as fire department inspection, endeavor to arouse public opinion to the end that fire marshal and department orders for changes looking to the lessening of hazards shall be promptly heeded, endeavor to educate members and business men generally in the matter of providing themselves in plant and home with that which will extinguish incipient fires, and, finally, establish that orderliness and freedom from accumulations of filth and rubbish which so frequently become the seat of fire.

"Resolved, That the incoming committee on fire insurance be asked by this convention to give special attention to the conflagration hazard of the untreated wooden shingle, as also to the part the ordinary frame dwelling within the limits of our cities has played in feeding the fire fiend, and work in co-operation with technical and general business organizations for the improvement of the conflagration hazard in the two respects named.

"Resolved, That the association continue to stress the necessity of bringing about a better understanding between the public and fire insurance companies, to the end that there be established a basis of cordial co-operation between them in bringing about proper regulation of fire insurance companies, as also in developing general interest in fire prevention, and, further, that every effort be made to prevent the enactment of laws which impose an unfair and uneconomic burden upon companies, tending thereby to restrict the supply of sound insurance."

A Lumberman's Frank Admission

In urging lumbermen to devise a process for treating building lumber so that it becomes, measurably at least, fire-retardant, A. T. Gerrans, secretary of the John L. Roper Lumber Company of New Berne, N. C., frankly states that unless this is done the wood industry will suffer.

We quote Mr. Garrans in part: "I think the lumbermen, including those who make shingles, must realize that they have not put their product in such shape as to merit the continued support of the public. There is no getting away from the fact that wood, no matter in what shape it is in, unless it has been treated in some way, will burn."

Fire Losses in School Buildings

"In the United States," says the *Boston Globe*, "a fire occurs every day in some school building. In the first 56 days of 1914 seventy-three such fires were reported. The direct financial loss was several hundred thousand dollars."

At a cost of $200,000, Charles Rosenberg of Evanston, Ill., will erect a three story and basement department store building in his home city. It will be of the slow-burning type of construction, with terra cotta front.

The fire loss at Fort Worth, Texas, during June amounted to $32,823.

Responsibility of Communities in School Construction

By FRANK IRVING COOPER*

THE law says to the parent, Thou shalt send thy child to attend the public school. If the parent has an abundance of money and is not satisfied with the public school he may send him to a school under a private supervision, but he must send the child to school.

The public, and that means the body of which you and I are individual members, is responsible for the safety of that child from the time it leaves home until its return. It should, therefore, provide school buildings in which the child is properly protected during the time that it insists that child shall attend school sessions. The life of a child is of value not only to the parent but to the State; that value has been computed in the terms of the great American dollar.

Almos every person present in some way represents the relegated authority of the public over the child at school. Many of us have to do with the erection or with the care of the school building in which the child is housed. In some great cities the public is alive to the dangers of unsafe school buildings, and it has become the general policy that these school buildings shall be of first class (meaning fireproof) construction; but in the small city, the country town and the village, the slogan "Safety First" has not been so much heard. The tax rate is usually high and the school buildings cannot be erected entirely of stone, brick and iron, but there must needs be much wood construction in order that the cost may be kept within what is popularly called a reasonable limit.

So far our thought is good, but now comes the question as to how a school building constructed mostly of wood ought to be planned. We must have entrances and exits as well as school rooms, we must have hallways and stairs; if the building is more than two stories in height it is now usual to consider an elevator, that crippled children may be carried from floor to floor; and in an old school building, when it is found impossible to rearrange the stairways, outside stairways may be needed.

Few superintendents and fewer building committees visualize the movement of the children through the school house when planning their new buildings; and unless they have had experience, few persons can picture what happens in the corridors and on the stairways when a rush for safety comes, on an occasion when smoke or flames burst into a passageway thought to be perfectly safe.

TRAGEDY OF BLOCKED EXITS

When fire was discovered in the school building at Peabody, Massachusetts, on the morning of the 28th of October last, not a teacher in the building thought of panic. The fire alarm sounded and the children, trained by long practice, started to leave the building. Unfortunately no one had anticipated that some day an exit might be blocked and the carefully drilled children forced to depart from their usual path to safety.

This fire in Peabody started so secretly and covered its tracks so completely that no one even now knows how it originated, though that it first started in the basement is proved.

It was customary to leave the doors at the head of the stairs to the basement open, and up the stairs rushed the smoke and flames just as the teachers, with their well-kept lines of children marching under perfect control, came down the stairs which led them to the danger point. In consequence there was fright, confusion and congestion at the front vestibule, into which opened the basement stairs, and the lives of twenty-one children were sacrificed. What an answer to the argument of school principals that it is impossible to keep order where stairways are closed off with doors!

The horrors of Collinwood and Peabody should forever stop the arguments for open stairways and corridors.

In one high school, for which I was architect, where fire and smoke stop doors were planned, these doors were finally omitted by direct order of the school authorities.

Now this attitude is the result of looking at the situation from one point of view, the viewpoint of school discipline.

Stairways can be made comparatively safe even in non-fireproof buildings; they should be, themselves, thoroughly fire-stopped and then enclosed from the bottom of the basement to top of the stairs in fire-resisting walls; from each floor this stair well should be entered through self-closing doors which should never be fastened open.

Another point: doors for fire protection should always be at the bottom of a run of stairs, not at the top. The wall between the top of the door and the ceiling prevents the hot air and smoke which are at the ceiling from entering the stairway.

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*Address delivered by Mr. Cooper before the annual convention of the American School Hygiene Association, held in New York City a short time ago. Mr. Cooper is a leading architect of Boston and has long been prominent in advocating firesafe building construction. The offices of the American School Hygiene Association are located in the State Education Building, Albany, N. Y.

USE FIRESAFE MATERIAL

When building the stairs no better expenditure of money can be made than by the use of fireproof material. Build with iron supports with treads of slate; still better, build the entire stair of concrete with non-slip treads built into each step, then enclose the stairway in fireproof walls having fire doors for entrance. This stair well should have all doors opening with the line of passage toward the exits. Exit stair-walls should also be continuous from the top to the bottom of the building.

It is poor planning if pupils are obliged to leave one stairway for another in order to reach an exit.

Stairways should not be too steep. The rise and tread should be carefully proportioned, they should not be over four feet wide between hand rails; if over four feet they should have a division rail in the center, otherwise a child, should it crowd into the center, will have no support and is liable to fall and block the passageway.

If the school building is large there should be a fire-wall dividing it into two parts, all openings in this wall being protected by self-closing fireproof doors. Children are moved more rapidly and safely through a door in a fire-wall than down a stairway.

It would be well if school authorities should study the Report of the New York Factory Investigating Committee, containing the recommendations of Mr. H. F. J. Porter, an industrial engineer who has made many investigations on the movement of crowds when leaving buildings.

In new buildings the architect should so plan the stairways, the approach to them and other means of exiting that outside escapes, which are always dangerous, would be unnecessary. In the case of an old building, however, authorities may find the building plan of such a nature that escape from some portion of the upper floors demands an outside stairway.

Without attempting to discuss the merits of the various types of towers and escapes, a few rules may be stated that should not be departed from.

METAL FRAMES AND WIRED GLASS

Ladder escapes should not be used on a school building.

Outside stairs should be entirely shielded by blank walls. If possible to accomplish this result all windows exposing the stairs should be glazed with wired glass set in metal frames.

To give access to the stairs a door at least 30 inches wide shall be cut through the wall, this door to be level with the floor of the school building and the platform of the escape. The door when open should not obstruct the pasageway; it should be fastened by a panic bolt.

Platforms and stairs should be enclosed with stout wire netting; there should be stout handrails on both sides capable of resisting the horizontal pressure.

In general the outside stairs should conform in width and pitch to those inside the building, the rise for school should not exceed 8¼ inches, and treads should not be less than 9 inches.

Model Code of San Fernando, Cal.

Section 14, governing the construction of "fireproof buildings," provides:

"That it shall be unlawful for any person, firm or corporation to erect, or cause to be erected, any building, or make, or cause to be made, any alterations or enlargement of buildings within the limits of Fire District No. 1 of the City of San Fernando, unless the same are made, erected, altered, enlarged or repaired in compliance with the terms of this ordinance. That all buildings erected, constructed, altered or enlarged, within the limits of Fire District No. 1, shall be made and constructed of brick, stone, solid reinforced concrete construction, or corrugated iron or other fireproof material, and every building hereafter newly roofed or covered shall be constructed with the side walls or party walls of brick, stone, concrete or other fireproof material, and these walls shall extend from the foundation to the top of and through the roof of the building; shall be so constructed as to thoroughly separate all the woodwork of the exterior and interior of such buildings from all and every part of the interior and exterior of every adjoining building; and every such wall shall pass through the roof of the building to which it may pertain in such manner as to break entirely any connection of wood whatever, between the roof of such building and any other building.

WOOD SHINGLE ROOFS PROHIBITED

All openings for doors, windows, etc., shall have good and sufficient arches, of brick or stone, well built or keyed, or lintels of stone, brick or iron. All posts or columns or store buildings shall be of incombustible material. The weather roofing of all roofs shall be of incombustible material, and the use of shingle roofs or other forms of combustible roof covering is prohibited.

CONCERNING CHIMNEYS

No chimney shall be built of less than four (4) inch walls, and no top shall be less than two (2) feet above the fire wall for a flat roof, or three (3) feet above any pitched roof. All walls of chimneys less than eight (8) inches thick, or those not lined with tile, shall be smoothly plastered for the entire height on inside and outside.

Fire Safety in Public School Building

By William B. Ittner, Architect Board of Education, St. Louis, Mo.

Extracts from an address delivered before the recent annual gathering of the National Fire Protection Association.

AFTER an extensive study of the matter, the best authorities agree that there should be fire escapes on the ideal school building, but that ample and well located inside stairways are the only means of emptying school buildings promptly and safely, and that this, together with making the buildings, both old and new, immune from fire through the application of modern methods, should be the aim of all school authorities. We are no longer satisfied with the buildings of twenty years ago. Some one has said that this is the age of school houses; there are great activities in education everywhere. Manual training and vocational courses are being introduced, demanding power plants and special equipment. In almost every community, movements for educational and social betterment are under way, and the school, being the logical centre for such activities, must improve and enlarge to meet the greater demand.

Along with the community uses of the schools, public attention is being directed everywhere to hygiene, sanitation, proper heating and ventilation, and the natural lighting of our schools. In the consideration of the more complex problem, therefore, is it not high time to bring the safety standards of our buildings more in line with the enlarged uses and the greater educational needs?

Isolating the Heating Plant

It is held by many that the proper protection against fire can be had only through the use of fireproof materials, but all school buildings cannot be erected fireproof, nor is it necessary that they should be to make them safe, if proper methods of construction are employed. Where funds will not permit the erection of fireproof buildings, it will require but a small additional outlay to fireproof the corridor floors and stairways, and where it is good practice to separate the boiler and heating plant from the building, additional expense, such rooms can be isolated in a manner to eliminate all danger.

School buildings should be fireproof whenever funds will permit, but while this practice should be encouraged generally, the safety of our buildings depends quite as much upon its general plan, the location of its stairways, corridors and exits, the disposition of the rooms, its height and the site upon which it is located.

The Exposure Hazard

The site should be of such dimension that the building is reasonably safe from fire attack from adjoining structures; the necessity for proper lighting in itself should demand a large site, insuring such isolation, so that hazards from this source need no further comment.

The building should be low, preferably not more than two stories above the basement. This, of course, is not possible in large cities where buildings of three or more stories are required to provide the necessary accommodation. Such buildings are rendered safe by adequate stairways and exits, and the most modern fireproofing methods, but they are the exception and not the rule, and we will address our remarks to general practice and not to special problems.

If large in plan, the floor areas in the building should be reduced by masonry walls, thus limiting the areas open to fire. The stairways, ample in number, should be located in a manner to reduce horizontal travel distance from class room to exit, and the exit should terminate at the street or yard level, and practically outside of the building, in order to obviate passing outside of the building, in order to avoid passing through halls or corridors before reaching the open air.

This system of school planning is well recognized on the European continent, not only as one offering maximum safety from the disposition of the class rooms in relation to corridor stairways and exit, and the limited areas open to fire, but as one offering all the advantages of perfect unilateral lighting.

Number and Character of Stairways

Stairways in proper number should always be provided, and no stairway should be more than five feet in width. Stairs should always be in two runs from story to story; should have broad landings, and there should be a handrail on the balustrade as well as the wall. Such a stairway will enable two files of children to go down abreast in perfect order without pushing or crowding.

The location and number of stairways is a matter of great importance, and this is one of the serious weaknesses in our school buildings, as the number is often reduced in the interest of economy. Stairways should be separated and arranged to serve definite groups of rooms, and located for direct lines of travel from class room to stairway. Thus a natural division of students is formed and congestion avoided. A closed balustrade of proper height is to be preferred to the open balustrade or boxed-in type of stair, and under no circumstances should the space under a stairway be used for storage.

The number of stairways and exits in a school building is a matter of calculating accommodations for the number of persons and the number of floors to be served. It is a problem for the individual buildings, and all that can be given is a working rule suggested by practice and experience; namely, that one hundred and twenty persons in lines, two abreast, can pass a given point in less than one minute. If, therefore, stairways and exits in sufficient number are introduced and properly placed to empty our building in three minutes or less, we are entirely safe.

In the matter of stairways and exits, the use of what is customary by the pupils a number of times each day during the entire year, will always prove the most effective means of egress in any emergency.

IMPORTANCE OF CORRIDORS

The importance of the corridors or halls in the planning of school buildings is very often overlooked by school authorities, and in a great many buildings their width and natural lighting are sacrificed in the interest of additional class room space. This is a serious mistake, as corridors should be wide enough to prevent congestion, and, where no fixed rule can be laid down, it may be said in general that for main corridors twelve feet may be taken as a minimum, with eight feet for side or secondary corridors; while fourteen feet and ten feet would be better. In high schools the minimum width for main corridors should be fourteen feet. The practice of placing wardrobes in corridors should be condemned on sanitary grounds alone, to say nothing of the congestion and confusion resulting from having them so located, and the practice of lining the corridors with lockers is open to almost as serious an objection.

School corridors should be kept clear of all obstructions; they should be well lighted, and when so arranged can be made a very valuable adjunct in the decoration of the school.

The lighting of the corridor is carried to the extreme in Continental schools, because it is lighted practically the entire length. The economy of the plan, though, is not as great as it is when the corridors are closed in for a portion of their length.

The class room should have but a single door to the corridor and this should be at the teacher's end of the room. I know in that there is considerable divergence of opinion, but this arrangement will give the teacher perfect control of the pupils under all conditions, and prevents them stampeding from the room, which is very apt to be the case if the room has a second doorway or an exit through the wardrobe.

Basement or cellars, as well known fire-breeders, should not be found in buildings designed for the highest degree of fire protection. A better practice is to make this story practically level with the grade; give it good height, and provide it with a window surface equal to or approximating that of the class rooms above. Such a story provides, at the least expense, the space for the heating and ventilating plant, rooms for manual training, domestic art and other rooms designed for equipment more or less hazardous.

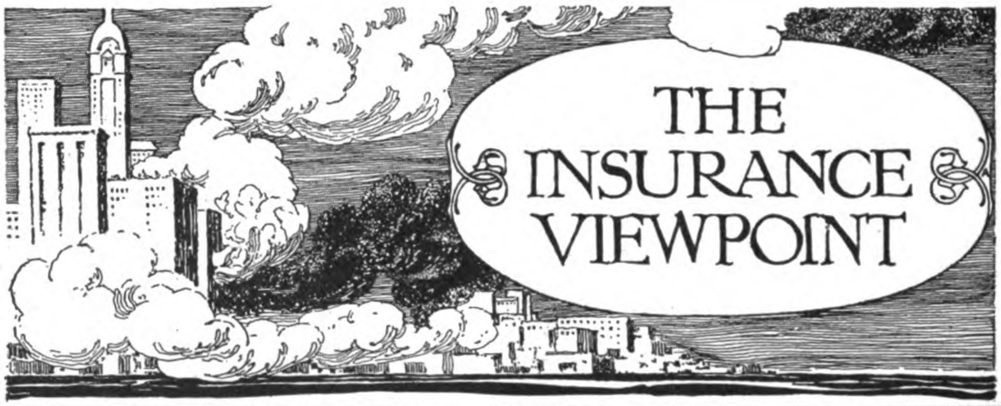
The boiler room, fuel room, and room for the heating apparatus should be cut off effectually, and all should be enclosed in masonry walls, fireproofed at the ceiling or floor above; the best practice precludes any doorway from these rooms to the remainder of the basement, and while this may prove of some inconvenience to the janitor, it provides maximum safety; such doorway, if one is provided, should be a standard, automatic closing fire-door. In the arrangement of the boiler and fuel rooms, ample space and height should be allowed to give easy access to all parts of the apparatus. Wood should be excluded entirely from this portion of the building, and there should be adequate natural light and ventilation.

The best practice also excludes wood from any portion of the heating and ventilating apparatus, such as hot and tempered air-room enclosures. Such rooms, if properly constructed in steel, may be made absolutely safe, and one very serious hazard may be permanently banished from the school house.

METAL TRIM, WINDOW AND DOOR FRAMES RECOMMENDED

In the finish of our buildings we should work for the elimination of all non-essentials. The amount of trim and finish should be reduced to a minimum; the highest degree of fire-resisting efficiency demands the elimination of wood altogether and the use of metal for all interior finish and interior as well as exterior openings; in any event, the effort should be toward simplification and directness of purpose in the entire equipment and finish of our buildings.

In conclusion, I think it may be stated, with some authority, that a school plan which involves correct principles of natural lighting, sanitation and hygiene, as now well understood, must, by the very nature of such a plan, be reasonably safe in its general arrangement. All that remains then is the intelligent application of modern fire prevention methods in determining the construction and detail in order to have our buildings immune from fire, safe and comfortable.



Loss Record of Mississippi Heavy

Mississippi continues to be a losing proposition for the insurance companies, its loss ratio for 1915, upon a premium income of $2,849,147 being 71 per cent. When it is considered that 40 per cent is the average expense ratio of the underwriters (which item covers commissions to agents, inspections, State and municipal taxes and head office operations) it will readily be seen that Mississippi property-owners are getting their indemnity below cost. The reason for this unfortunate condition lies mainly in the poor dwelling construction in the State, the great majority of the residences being frame, shingle roofed and with improperly built chimneys.

Before improvement worth mentioning can be had there must be a realization on the part of the public authorities of the seriousness of the situation, and the enactment of building ordinances that will compel safety measures and the erection of a superior class of structures.

Responsibility to the Community

"It is a very encouraging sign of the times," says Insurance Commissioner Darst, of West Virginia, "that architects, builders and owners are recognizing more and more the importance of the question of fire hazard, not only from the point of view of safety, but from the apparently more practical standpoint of fire insurance rates.

"An unsafe risk is not only a public menace, but it also penalizes many innocent property-owners whose buildings are exposed by it; hence the construction of any building is a matter of legitimate interest to all those whose property adjoins it, and, viewing it more broadly, to the whole community."

An Obvious Truth

We need no technical explanation of the causes of the March conflagrations that swept Augusta and Nashville, and Paris, Texas. Unprotected window openings, wooden buildings and the wooden shingle: these are the hazards so prevalent, so patent and yet so potent to the most elemental intelligence as to make public reference to them seem like a pompous declaration that wood will burn or flame will follow a draft.—Franklin H. Wentworth, secretary National Fire Protection Association.

Greatest Shingle Fire Hazard

Owing to climatic conditions in Texas, says the State Fire Insurance Commission, wood shingle roofs "present one of the greatest hazards we have."

Crippled Children in Danger

Lives of 200 crippled children were placed in jeopardy a week or two ago when several buildings of the Rainbow Cottage settlement at South Euclid, Ohio, burned.

When the flames reached the main dormitory, nurses from the hospital, aided by volunteer citizens, carried the helpless children to safety.

Fortunately no lives were lost, though they might easily have been had a high wind been blowing at the time. The happening emphasizes the criminal folly of housing a lot of children—and cripples at that—in a wooden building, large of area and with numerous passageways.

The only type of structure for housing invalids and children is that built along firesafe lines.

Wary of Southern Frame Dwellings

So numerous have losses become on frame shingle roof dwellings and farm property in the South that fire insurance companies generally regard such risks with disfavor and accept them very gingerly, while some offices refuse to write them at all.

While the responsibility for the existing situation cannot be placed wholly upon the wood shingle roof, this form of covering is one of the important factors influencing the underwriters.

New Building Ordinances of Los Angeles

During the past month or more, according to *Building Age,* important changes have been made in the building ordinances of Los Angeles, Cal., the Revision Commission, of which J. J. Backus is president, having recently completed its report after two years of work and filed a report of 70,000 words containing a draft of the proposed ordinance. The latter is intended to codify in comprehensive form and bring up to date the building regulations of the city. No radical departure has been made, as a rule, from the previous ordinance, such changes as are introduced being usually in the direction of economy and saving to the owner, in accordance with the results of experience in other large cities.

An important feature is the new section relating to the construction of hollow tile buildings, the new code permitting the use of hollow terra cotta tile for exterior walls in Class A, B or C buildings outside of certain fire districts, up to 50 feet or four stories in height, except that party or bearing division walls may not be of hollow tile. One-story dwelling may be built anywhere with exterior walls of hollow tile, brick or reinforced concrete not less than 4 inches thick, 9 feet high from floor to plate, with 4 feet extra for gables; while two-story dwelling may have 12-inch wall for the first story and a 6-inch wall for the second, of hollow tile, brick or concrete; certain restrictions on the method of construction being included. Hollow cement blocks are permitted in place of hollow tile.

The reinforced concrete section, the first work of the commission, was passed twenty months ago, and has effected a great saving of materials through the raising of the allowable stress on concrete, etc. A comprehensive ordinance relating to fire escapes, standpipes and automatic sprinklers, recommended by the commission earlier in its work, has given satisfaction, and both are included in the new code.

Selected to Prepare Code for Kansas City

In accord with the authority recently vested in him by the common council, Mayor Edwards of Kansas City, Mo., some days ago selected four experts—one being an architect, an engineer, fire underwriter and building contractor—to draft a new and much needed building code for the city.

The appointees are: Frederick C. Gunn, E. Lee Heidenreich, Francis J. Fetter and James E. Taylor.

Mr. Gunn is a graduate of Rensselaer Polytechnic Institute, of Troy, N. Y., and has had 25 years' experience in his profession. Mr. Heidenreich was consulting engineer in drafting the building code of New York City and is the author of numerous engineering works. Mr. Fetter has been in the fire insurance business for fully a quarter of a century, and has a peculiar knowledge of the fire hazard of buildings. He is manager of the Missouri Inspection Bureau. Mr. Taylor is a general building contractor of ripe experience, and was recently president of the Master Builders Exchange of Kansas City.

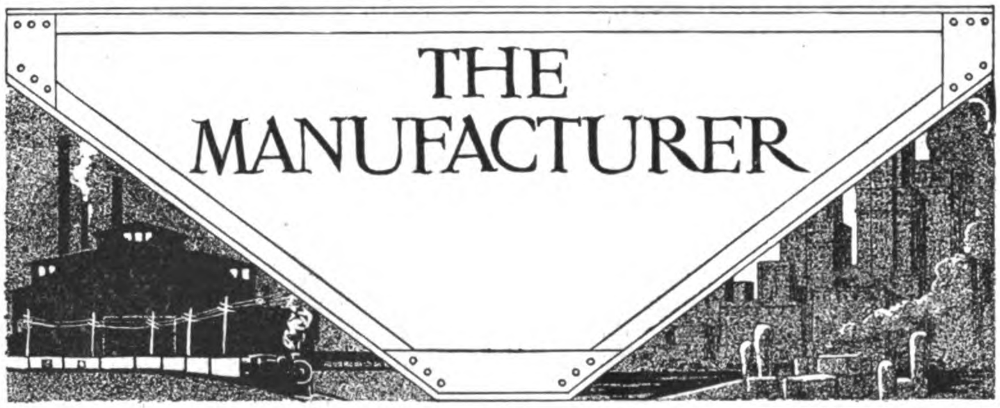
Electric Wiring at Montgomery, Ala.

Under an ordinance adopted in January last, creating the office of city electrical inspector, excellent control is now had over all new electrical installations at Montgomery, Ala., and the danger of fire from such source substantially reduced.

A further needed improvement is the extension of the present fire limits, the growth of the city in recent years making such action highly desirable.

Savannah, Ga., to Consider Code

It is expected that the general code of ordinances, embodying building laws, electrical ordinances and regulations for the control of explosives and inflammables, which the chief engineer of the South Eastern Underwriters Association has been working upon for some time past, will be ready for submission to the mayor and council of Savannah, Ga., at an early date.



THE MANUFACTURER

¶ Co-operation is sounding a new note of progress across the vast fields of American industry.

¶ Here is a great undeveloped market for your product.

Sprinklers as Life Savers

There are three main and distinct ways in which lives are lost in fires, says *The Travelers Standard,* these being (1) by the burning or suffocation of the firemen or of the occupants of the building; (2) by crushing and falls resulting from panics, and (3) by the falling of the walls of the building upon the firemen engaged in extinguishing the fire. Fatalities seldom occur from any of these causes, however, until the fire has gained considerable headway. It is, therefore, evident that loss of life and personal injuries can be greatly reduced by checking or extinguishing fires at the start, and it is universally admitted that automatic sprinklers do this quite effectively.

It is not necessary that the workman should come in actual contact with fire in order to be killed or injured. Smoke and the half-consumed products of imperfect combustion may cause great havoc among the employees, even when the accidents due to actual contact with the fire or from falling floors and walls are few in number. This has been proved, over and over again, by sad experience.

Practically all fires except those caused by explosions are quite small at the outset, and the rapidity with which a fire gains headway depends largely upon the amount of combustible material in the vicinity and upon the draft created by the fire itself. A city fire department can seldom have a stream of water playing on the fire in less than six or eight minutes from the giving of the alarm. Allowing two minutes as the average elapsed time between the start of the fire and the turning in of the alarm, it is therefore plain that the fire will have burned some eight or ten minutes before effective aid from the fire department is available. It is admitted that this is often the critical period of a fire, so far as its ultimate capacity for destroying property is concerned, and it is likewise the critical period during which the occupants of the building can make their escape to safety. Each moment after the fire starts adds to the difficulty and the danger, and in many cases lives are lost because the fire has gained such headway before discovery that egress by the regular exits or by the fire-escapes is impossible. The fire department is often almost helpless under circumstances of this kind, no matter how efficient it may be, nor how brave and competent its members are. The effectiveness of the sprinkler in coping with fires in their incipient stages is demonstrated beyond cavil by the records of 14,714 fires that have been studied by the National Fire Protection Association.—*Eastern Underwriter.*

Fire Hazard of Wood Pavements

That the wood paving block presents a serious fire menace to communities using it has been proven on numerous occasions, the latest being the burning of a large section of the new Locust street viaduct at Omaha, Neb. At the city named, on June 4th, an overturned kettle of hot tar so badly burned the wooden pavement and the supporting steel structure as to cause $50,000 damage.

As cement, brick, or other properties supply a roadway far more enduring, firesafe, and altogether more satisfactory than wood, it is difficult to understand why the use of the latter material should be even considered.

New Building Ordinances of Los Angeles

(*Continued from page* 39)

The structural steel and structural engineering provisions have been considerably elaborated and will be of great aid to architects and engineers. One important change is the requirement of fireproof sash and window frames within certain fire districts, which does away with fire shutters. Requirements for boiler room construction have been made more exacting, and general stairway requirements enlarged upon.

With the report a number of recommendations were submitted, to be codified later if approved by the Council.

Common-Sense Home Building

By C. STANLEY TAYLOR

2.—Selecting the Site for the Home

The following article is one of a series which will appear regularly in CONSTRVCTION *for the purpose of helping the prospective home owner to properly locate and build his home. The many perplexing questions which confront the man about to own a home will be taken up in detail. Here he will learn many things about home-building which will prove to be of value in time and money-saving, and will help him to avoid many of the mistakes which have brought trouble and disappointment to thousands of home owners.*

Articles in this series which have already appeared:

Common-Sense Home Building

THE matter of the selection of a site for the home is one in connection with which far too little judgment and foresight is ordinarily used. Very often it has taken considerable effort to get together the money which is to be invested for this purpose, and when this has been finally accomplished the man-about-to-build is usually somewhat familiar with the various available sites in sections in which he may desire to locate. The question then is which one to choose. Here a particular advantage is offered—there exists a condition which is not to the liking of the prospective purchaser. When it becomes known that he is looking for a place to buy or build there comes a deluge of literature praising this or that development or allotment. The real estate broker appears with many apparently attractive propositions and friends offer well-meant advice.

The selection of a site then must be by a process of elimination, and in the following paragraphs we will deal with some of the important factors which should enter into this selection.

General Location of the Site

The very first question to be decided is that of general location. Is the house to be a water-front property for all year residence, is it to be within the city limits or in one of the pleasant suburban towns? This question must of course be governed by conditions of vocation, convenience and taste. The most important point is that of reaching an absolute and final decision as to general location before going on to solve the problem of specific location. Thus the selection will be narrowed down to communities of the type decided upon without gravitating from one general idea to another. If the lake or river or ocean shore offers the most attraction, confine all efforts to such locations. This may seem obvious, but years of experience have shown that the average man-about-to-own-a-home scarcely ever makes a decision in this respect; but wanders aimlessly from one type of home site to another, wasting time and money in so doing and probably arriving at a decision which is regretted later.

At this stage of the game do not do as so many have—plan the house before locating it. Have in mind how much inside space is required and approximately how much a house will cost; determine how much can be invested in the necessary ground and then go out and buy it for less—never more! All that can be saved on the ground will be needed to put into the house.

The next thing to be determined, and all this is before actually going out to look at specific sites, is the amount of ground desired. Here the personal element enters again. If there are growing children, even of the future, it is better to have a little more ground in a neighborhood which is perhaps less convenient and so keep the children off the street. Let health, both moral and physical, be the first of all considerations.

Finally, before going out to look over properties, there is the matter of convenience. Undoubtedly there are those in the family whose work necessitates daily attendance, or commuting. Consider carefully how much time can be given to getting from home to work. An hour each way is too much, except in the summer; forty-five minutes is not bad, but half an hour or less is desirable in that it means a saving of time and temper. Consider, too, the cost of commutation and what the maximum can be.

General location, size of house, size of ground, distance from business and costs have been considered; and having decided carefully the foregoing points, an intelligent search may now be made for the ideal location.

Now, taking definite locations into consideration, there are certain points which must not be overlooked:

The Question of Taxes and Assessments

The fact that one owns a home does not mean that there will be no rent to pay; it means only that the rent will be paid in a different manner and under a different name. Taxes and assessments, interest on mortgages and maintenance costs all must be met.

With a view to keeping down these costs as much as possible the matter of taxes and possible assessments must be carefully considered. Assessments are unpleasant necessities and are constituted of the charges made by the local government for improvements made to streets adjoining and near the property in question. Such charges are for sewer construction, water-pipe laying, grading, curbing and flagging, and are made on the assumption that the property owners who directly benefit by these improvements should pay for them.

Very often all or part of this work is done by those interested in the development of the property, charged to the city under an agreement, and later paid in the form of assessments. Very often, too, there are charges against a property for assessment levied in the past, also for unpaid taxes. The simplest manner to avoid taking over unknown liens when buying property is to insist on receiving a title policy. The title insurance business is in existence in practically every section of the country, and will report on a property and guarantee the title for a modest sum. This title policy should be furnished and paid for by the seller.

If the prospective site of the home is in a section where very little has been done in the way of improvement, a time will certainly come when assessments will be levied and must be paid. Of course such improvements enhance the value of the property, but it is a question whether or not it pays to buy where improvements are not already in the street and paid for; at least such charges must be expected and preparation made for their payment.

Taxes, of course, are levied on all property and will increase as the years go by; but as tax rates vary considerably in different localities it is well to look into these charges and let the amount govern to a certain extent the selection of a site.

Future Developments

When selecting the home site it is well to study the trend of the neighborhood. If it is in a section just on the outskirts of a large city care must be taken to buy property that is not restricted for too long a period of time. This matter of restrictions will be explained in a following paragraph.

In locating the home in the path of the natural development of a city it must be realized that, although the neighborhood is high class residential at the present time, it may be far from that in ten or twenty years. Here the wise man will buy or build, with the idea that when the natural development has taken place, transit facilities extended and apartment houses and business sections are beginning to build up nearby, he will sell out at an increased price for his land and go elsewhere to locate his home.

The Property from a Physical Standpoint

In the first place when a site for building a home is being considered it must be remembered that excavating will be necessary and that excavating is expensive, particularly if there is rock on the property. Rock is of varying consistency and does not always show above the ground. Look over the locality a little and see if there are outcroppings of rock nearby, study the direction of the strata, and it is often easy to determine whether or not much rock will be found when excavating for the cellar. If this means does not suffice, try boring. This is simply sinking a drill in several places on the property until rock is struck or until it has gone sufficiently deep for the excavation. This will quickly determine the rock question.

Again the hardness of the rock has much to do with the cost of excavation, which will vary practically in proportion to the degree of hardness.

Usually where there is a wrong condition its absolute reverse is also wrong. So in this case it may be found, particularly in sections along the seaboard and near large lakes and rivers, that the bottom is soft; not too soft for the construction of a house, perhaps, but too soft for heavier buildings of the future. These spots are usually located on the beds of old creeks or rivers and locations on the site of old water courses are good things to avoid.

To avoid moisture, unhealthy conditions, damp cellars, etc., locate where there is good drainage, preferably on a high spot. It is interesting to note that man has always instinctively sought the high spots for dwelling purposes. In New York City, for instance, the poorer and squalid sections are invariably located in depressions and hollows and along the river front, while the highest sections of the city are the best.

Safety Against Fire

The question of safety against fire in communities has already been taken up in a previous issue (June), but as it has a direct and important bearing on the subject of selecting a site for home building, we will touch on it briefly.

Communities which are composed largely of frame dwellings, having wood shingle roofs, are exceedingly dangerous spots in which to locate a home. The danger of fires set from sparks from chimneys and from conflagrations which will travel easily from house to house cannot be overestimated by the prospective home builder.

This, too, is but a matter of common sense. If a community is composed of dwellings which have masonry exteriors and fire-safe roofs, does it not stand to reason that there is much less danger of communicated fire? Fire is invariably communicated from one building to another through the medium of sweeping flames or flying sparks. We know that wood, particularly dry seasoned and painted wood, will burn readily; and if the exterior of the house is lined and covered with this material does it not seem reasonable to believe that flying sparks and brands will here cause much more damage than in the case of unburnable exteriors?

Realizing the existence of this severe potential fire hazard in localities where frame construction and wood shingles are prevalent, is it not exercising common sense to locate the home in communities of brick or tile or concrete or stucco houses?

In a later article in this series will be considered the question of making the home safe against fire in which costs will be considered and the practical safeguarding of the interior of the home carefully described.

The Matter of Restrictions

In the selection of a site for the prospective home, whether vacant property or a completed house, a matter for serious consideration is that of the restrictions which may have been placed on the property.

Property restrictions are simply a series of rules governing type of buildings, occupancies, et cetera, and are usually placed on the property in the following manner:

1. By those who originally planned and laid out the development or allotment.
2. By an agreement of a number of property owners forming a community.

These restrictions are placed on the property for the purpose of maintaining the spirit and beauty of the neighborhood, and to insure the owner of property that undesirable commercial activities or unsightly dwellings will not enter into the community in which is located his home.

Such restrictions may be any of the following, which will serve to explain the general idea of restrictions:

Limited construction—high class residential section:

1. Dwellings.
   - (a) To cost not less than $———.
   - (b) To be not more than 2½ stories in height.
   - (c) To be set back —— feet from street line.
   - (d) To be located on plot not less than 5,000 square feet in area.
   - (e) Walls to be of masonry construction and roofs of fire-retardant material.
   - (f) Limit to size and number of garages, barns or out-houses.
2. Multi-family houses.
   - (a) Usually not allowed except duplex or 2-family houses.
   - (b) Apartment houses, if allowed, limited as to location, size, construction, etc.
3. Commercial.
   - (a) No manufacturing occupancies allowed.
   - (b) Stores, if any, limited as to nature of business.

As these restrictions are placed on property by individuals they are, of course, framed to suit the requirements and purposes of the community and will therefore be found to vary according to individual ideas. The restrictions are incorporated as part of the original deed of the property to be in force for a definite period of time, usually varying from 20 years upward.

From a legal standpoint these restrictions, though in no way enforced by State laws or local ordinances, will hold until the prescribed period of time has elapsed. Such restrictions can be removed from the property only by those who placed them on it, provided some of the property has not already been sold subject to these restrictions. Hence it is plainly evident that those who purchase restricted property are subject to the conditions set forth in these restrictions and cannot expect to proceed in any manner contrary to that prescribed without being subject to injunctions procured by neighboring property owners.

Title insurance and property loans are always made after taking into consideration the restrictions, if any exist, and their influence on the value of the property.

Here, then, enters a serious question. How will the restrictions influence future values? There can be no doubt that restrictions are of value in developing high class residential sections, but their influence on future values is of decided importance to the man-about-to-own-a-home.

A careful study of conditions would seem to show that it is impractical to purchase restricted property in any section which stands in the path of the natural outward development of a large city.

Near all of our larger cities will be found communities which are in the "in between" stage. Extended transit lines have made possible quick transportation to the business centers, with the result that the speculative builder has put up apartment houses wherever he could find unrestricted property. What of the restricted sections, then? Surrounded by the city growth of multi-family houses, stores of various kinds, and, perhaps, or usually, an undesirable tenantry, the charm of the home section is gone; the value of the house is nothing; the property value at this period being in increasing ground values only. The rental value of the houses fall off, the property owner desires to move to a different locality—but how is he to get out his investment? He cannot sell for the purpose of apartment house or store construction because of the restrictions! Therefore he must be content to live in a neighborhood which has become undesirable to him and to his neighbors who have formed the restricted community, or accept a loss on his property. In cases of this kind the restrictions are sometimes deliberately broken as a test case or the property owners come together as a body to remove the restrictions; but almost invariably there is a dissenting vote from those who are satisfied to stay on, and, in the strange way of community dwellers, are ready to make trouble for the man who breaks restrictions.

When buying a home site on the outskirts of a city, it is better to purchase unrestricted property in a good neighborhood, with the expectation of development within 15 or 20 years, which, though it necessitates removal, will give the owner a return in the way of enhanced property value, which may be taken advantage of without encountering the serious obstacle of restrictions.

On the other hand, where the proposed home site is to be located in sections which do not lie in the path of city expansion, care should be taken that the entire neighborhood is carefully restricted against the invasion of undesirable elements of any kind.

◆

Chicago Sets Splendid Example

The City Council of Chicago has ordained that hereafter water shall be furnished for the purpose of supplying devices used for fire protection, such as standpipes and automatic sprinklers.

The provisions of the ordinance are as follows:

Water pipes, in connection with the city water mains, entering any premises and used exclusively for fire protection purposes shall be controlled by an indicating or recording device approved by the Commissioner of Public Works and at the expense of the owner or consumer.

There shall be no charge for city water supplied and used through such water pipes for extinguishing fires or by absorption.

Exclusive fire protection water pipes, connected with the water piping system on the house side of the water meter controlling city water, must be fitted with recording devices at the expense of the owner. The amount charged for the water flowing through these pipes will be deducted from the regular charges for the building.

It shall be the duty of the Chief of Fire Prevention and Public Safety to make or cause to be made proper inspection of such systems once every three months and submit to the Commissioner of Public Works a report covering same.

This matter of free water for fire protection is one which should be taken up aggressively by the various fire prevention bodies and officials in the cities of America.

Its direct value lies in the fact that it must necessarily encourage the installation and maintenance of protective systems involving the use of water directed immediately at the incipient blaze.

Greater than the financial inducement offered to owners of large building is the psychological effect—the direct proof that they are backed by the municipality in every effort to reduce the fire hazard.

The great value of such co-operation cannot easily be estimated; but its effect in directing the minds of property owners toward a favorable consideration of proper fire protection and the installation of automatic sprinklers must prove of direct benefit to the community and to the nation.

Building Activity at Augusta

Lombard Brinson, secretary of the Merchants and Manufacturers Association of Augusta, Ga., reports that during the period of March 22 (the day of the sweeping conflagration in which property valued at $5,000,000 was destroyed) until June 1, exactly 401 building permits had been taken out. All of the new work, of course, must conform to the requirements of the revised building code, insuring far greater safety and comfort than was possible under the former wide open ordinances which permitted the free use of wood, not only in porch construction, but in roof coverings as well.

Of the permits granted to June 1, 96 were for entirely new buildings, the other issues being for alterations and repairs more or less extensive. The aggregate cost of the entire work is placed at $380,880.67.

G. Lloyd Preacher, one of the foremost architects in the city, has prepared a number of plans for structures of various types, some of which are in process of building, while bids will shortly be asked for others. Other architects are similarly busy and before the close of the present year it is confidently predicted that a considerable section of the destroyed area of the city will be rebuilt.

Would Hold Railways Liable

Fire insurance companies have instituted action against a number of railways to recover for heavy losses paid by virtue of the disastrous conflagrations at Paris, Texas, on March 22 last. The contention of the underwriters is that the fire originated in the terminal yards of the railways, and that the latter are, therefore, responsible for the consequential damage.

Fine Office Building for Chattanooga

The new home office building of the Volunteer State Life Insurance Company at Chattanooga is one of the finest structures of its kind, not only in Tennessee, but in the entire South, and it is expected will prove an incentive to the erection of many similar properties throughout the territory.

Twelve stories and basement in height, the building is of skeleton steel frame construction with curtain walls of brick and tile. The floors are of concrete and tile. The three lower stories are of terra cotta and Tennessee marble. The architecture is Italian Renaissance.

Arthur C. Bossom, of New York City, designed the new structure that the Colonial Trust Company is to erect on the northeast corner of Thirteenth and Market streets, Philadelphia. The building will be 13 stories high and of reinforced concrete and brick construction.

SAFE HOMES

A DEPARTMENT OF "CONSTRVCTION"

Devoted Exclusively to the Interest of the Home Builder

Edited by Ralph P. Stoddard

BUILD NOW!

IN spite of the fact that material prices average generally throughout the country slightly higher than for a number of years past, enormous gains in building activities are shown.

Duns Review reports the aggregate value of building permits taken during the month of May in seventy-five leading cities to have been $87,352,814, as against $69,974,342 for the corresponding month a year ago, or a gain of almost 25 per cent.

Starting with Greater New York, which reports building activities 9.3 per cent in excess of a year ago, every large city shows substantial gains over the year 1915—

Excepting Cleveland.

The Sixth City is suffering a decline—and this in face of the fact that in 1915 it was practically the only large city in the Central West that showed any signs of real life in the building industry. During that period of country-wide slackness, Cleveland was passing its record for 1914, which is considered by most cities as their banner year in building.

This very boom, which distinguished Cleveland in 1915, is now responsible for the depression it now is suffering in its building industry. Construction being at a standstill in other cities, makers of building materials and supplies were compelled to seek elsewhere an outlet for their products. The result was Cleveland was swamped with building supplies of all kinds, many of which were sold for any price obtainable. This created an era of cheap building, which probably never again will be equaled. Low prices of materials and labor equalized, and in many cases more than offset the added cost in money, so that building went on at a tremendous pace.

With the advent of better times throughout the country, which has developed into a virtual boom, a scarcity of labor was created that has resulted in raising labor costs from 10 per cent to 25 per cent. This has led the general public, unfamiliar with the labor problem, to attribute higher building costs entirely to advances in materials.

Such, however, is not the case. In only few instances is the cost of material more than 10 per cent, while from 4 per cent to 10 per cent has been cut from the prices during 1914, which was in Cleveland a year of fair average prices for both labor and materials.

The low prices in 1915 were due almost entirely to the low cost of labor, the largest individual item in building costs. The manufacture of cement, lime, tile, brick, etc., is almost entirely a matter of labor. In handling the finished products from factory to cars, from cars to warehouse and from warehouse to the job the ultimate cost must be increased by the large items of labor. To this must be added the great cost of labor in construction.

With these facts in mind, the following table of comparative prices goes to show that even with a 5 per cent advance in freight rates, prices of materials are really lower than in 1914:

	1914		1916		Increase	Decrease
Portland Cement.....	$0.50	per sack	$0.53	per sack	6%	
White Cement........	1.25	per sack	1.20	per sack		4%
Bulk Cement.........	.40	per 100 lbs.	.45	per 100 lbs.	12½%	
Hydrate Lime........	.27½	per 50 lbs.	.28	per 50 lbs.	4%	
Wall Plaster.........	7.50	per 50 lbs.	8.00	per 50 lbs.	7%	
Sewer Pipe 6 in.......	.14	per foot	.12$^{4}/_{5}$	per foot		10%
5x4x12 Tile..........	20.00	per 1000	22.00	per 1000	10%	
Crushed Stone........	2.00	per ton	2.10	per ton	5%	
Washed Sand.........	1.75	per ton	1.85	per ton	6%	
Face Brick...........	16.50 to $27.00		15.00 to $25.00			5 to 10%

Compared with other cities material prices in Cleveland are decidedly low. In comparison with Detroit, for example, which is of about equal size with Cleveland and is pressing it closely for sixth place in population, costs of almost every sort of material are considerably lower. The wide difference is shown in the accompanying table:

PRICES JUNE 1, 1916, DELIVERED BY WAGON

	Detroit	Cleveland
Portland Cement per sack	$0.60	$0.53
Bulk Lime per 100 lbs	.50	.45
Hydrate Lime per 50-lb. sack	.30	.28
Sanded Wall Plaster per sack	.38	.40
Sewer Pipe, 6-in., per foot	.14	12. 4-5
Crushed Stone per ton	2.15	2.10
Washed Sand per ton	1.70	1.85
Common Brick per M	9.50	$8.00 to $9.00

Other factors also point to the advantage of building now instead of waiting for lower prices—a condition at best problematical and far in the future owing to the fact labor prices are slow in changing and that there is no indication of a let up in industrial activity yet in sight.

The differences with labor all have been adjusted satisfactorily, and the car shortage, which has seriously affected some cities, has spared Cleveland.

With all the above facts in favor of building now, where is the advantage to be gained by waiting? Banks are favoring real estate and building loans, and this cheap money will save at least a part of the higher wages paid to labor.

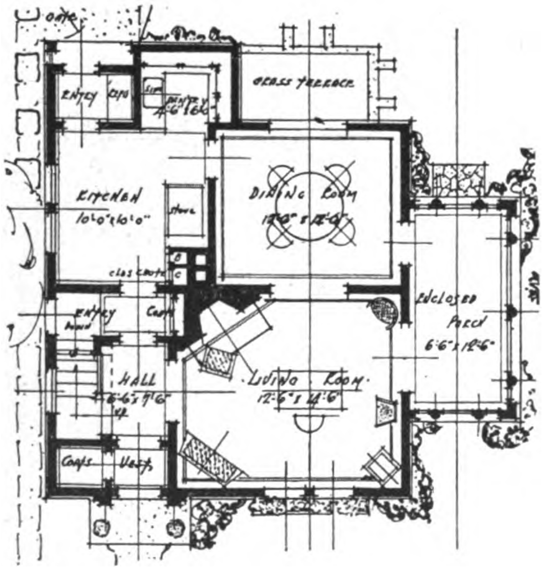
Build now!

Common Sense Home Building

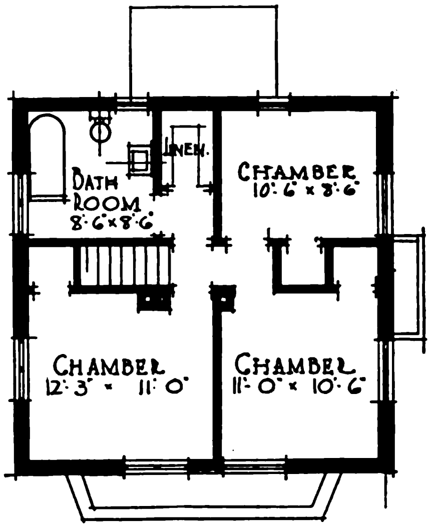
IN the last issue of CONSTRVCTION there appeared an article under the above title which apparently sounded the keynote of popular interest.

This article has already been reprinted by numerous metropolitan newspapers in their large weekly issues.

The subject of common-sense homebuilding will be considered in all its details in this and the various issues to come. Here will be considered such factors as selecting the site; financing the building project; employing the architect; relations of contractor, architect and owner; fireproof roofing; firesafe walls, floors and partitions; fire-protection in the home, and other similar detailed discussions of interest to the home-builder and home-owner.



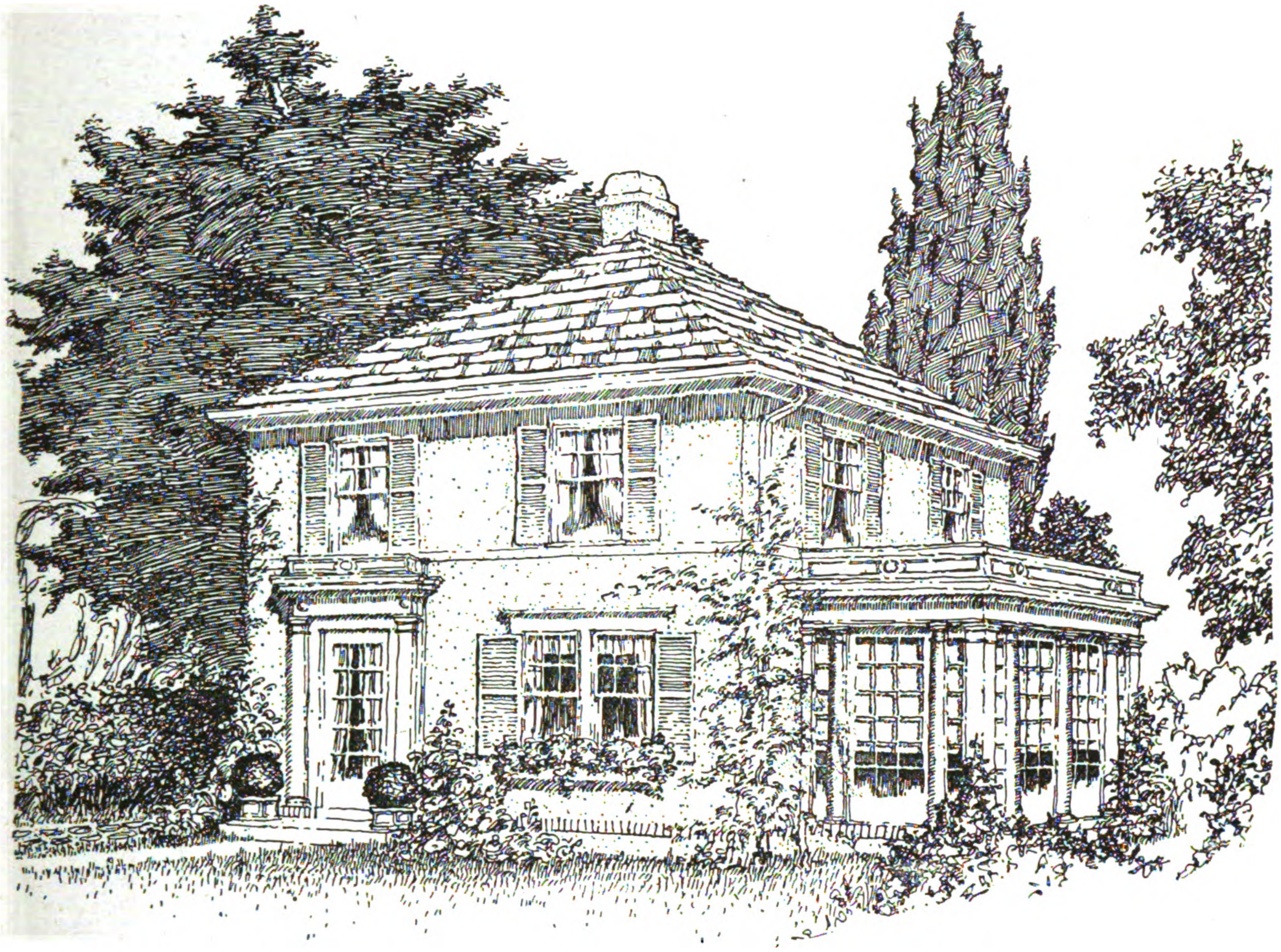
First floor plan of house shown on opposite page



Second floor plan of house shown on Page 50

CONSTRVCTION will be glad to receive any suggestions, data, etc., relative to this subject from architects, manufacturers, contractors and other interested persons. The matter of sensible homebuilding is of vital importance in the reduction of the fire waste. Great conflagrations usually gain headway in dwelling-house sections where wood shingle roofs and frame construction offer the best fuel for rapid consumption by the flames. Every resident in sections of this type is constantly in danger of losing his home, possessions, and possibly the lives of members of the family are endangered.

This series of articles should prove interesting and profitable to all who have to do with the construction and occupancy of the homes of the people.



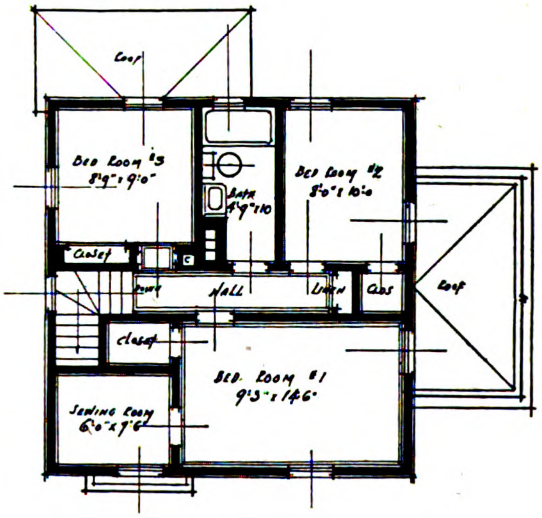
House of Simple Design

For simplicity and straightforwardness of design it is difficult to find a little home equal to this, which is the design of Walter E. Gast of 679 Northumberland avenue, Buffalo, N. Y.—or one so complete.

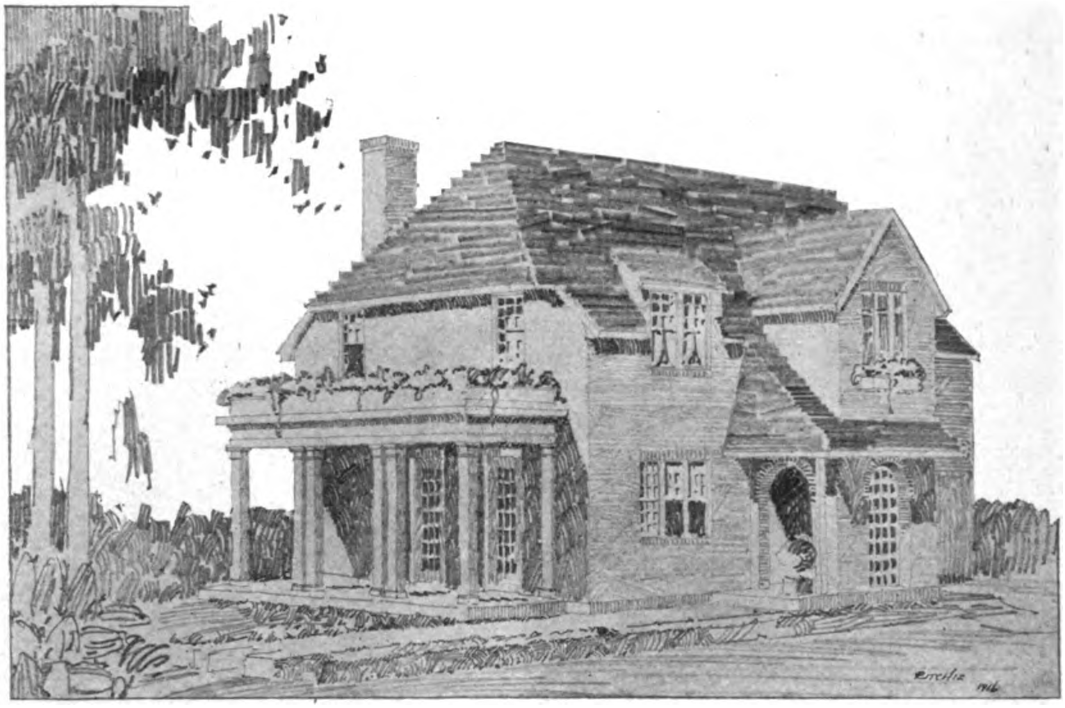
Of its many features, the enclosed porch on the side, the entrance hall, giving combination stairway and passage from kitchen to front door, the pantry, the unbroken vista through living and dining rooms and the square rooms, the walls of which are free from jogs and breaks, are but a few. In fact, it is hard to pick a fault of any kind in its planning.

The design of this house lends itself best to the use of stucco or hollow tile, with roof of green slate or tiles, and window and door trimmings to match. Against a background of green, this little home would make one any person might be proud of, no matter how pretentious its neighbors.

Estimates of its cost indicate it could be completed ready to move into for about $4,500.



Second floor plan



A Modern Colonial Home

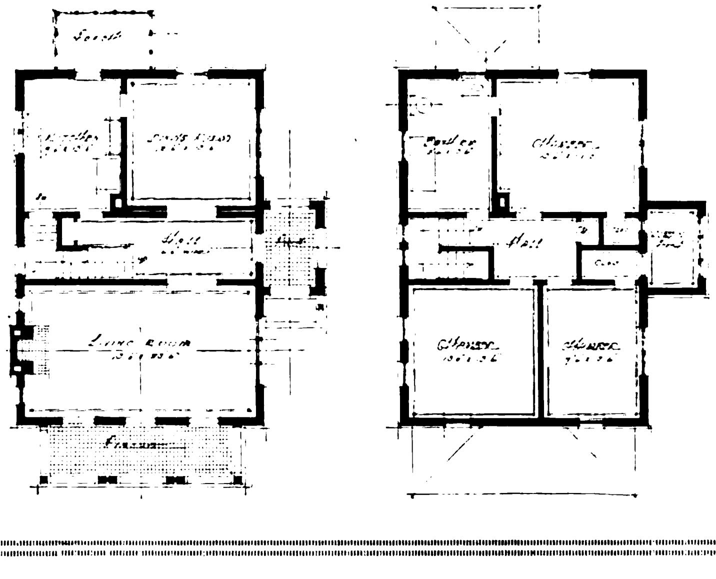
The house with a center hall—Colonial type, so-called—has never waned in popularity from its first inception. As many persons as ever admire this plan and thousands of homes employing this feature with variations are built annually.

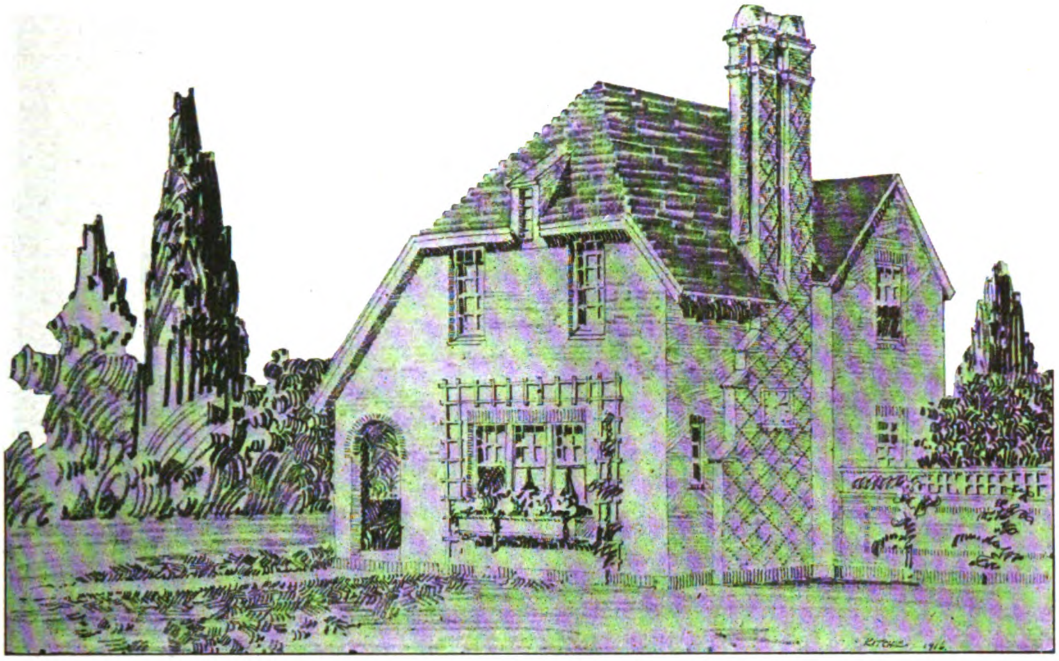
While many of these are of frame, the ideal structural material is brick. It was of brick that the originals were built, and the type seems to be best suited to the use of burned clay. Face brick backed up with hollow tile and with a fire-resistant roof, a Colonial home built to-day should stand as long as its predecessors, providing a home for several generations.

The house shown is from the board of Geo. W. Ritchie, Leader-News Building, Cleveland. It will be seen that he has produced a plan that is applicable to a narrow lot, while preserving all the best features of a house of this type.

Bids taken upon this house in Cleveland ranged from $5,000 to $5,400, complete.

At the Eastern office of *The Safe,* Brokaw Building, 1457 Broadway, New York, or at 354 Leader-News Building, Cleveland, Ohio, complete plans and specifications for this house may be obtained for $2.00.





A Middle-West Home

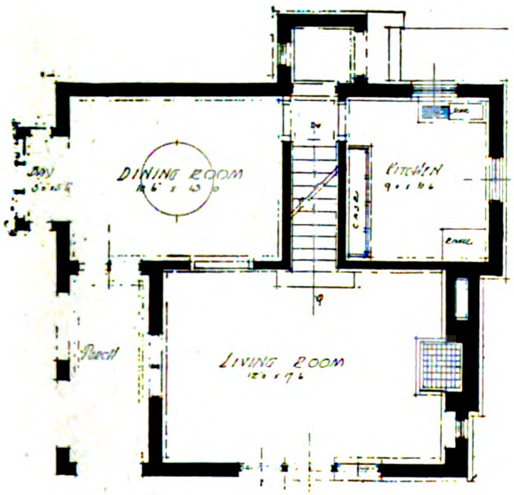
This little brick home, built during the past year in Canton, Ohio, fairly represents the quality and character of homes in the better residential districts of medium-sized mid-Western cities. While many of these are enjoying unprecedented booms—with resulting speculative building in new districts—they are naturally conservative—and their homes show it.

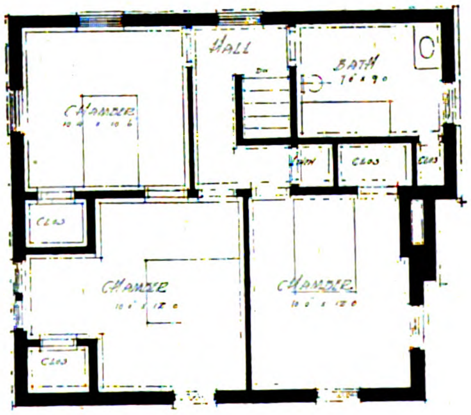
To ward against darkening the best room, which is of course the living room, the porch has been placed on the side and made an integral part of the house—after the so-called cottage type. The dining-room, with the flower-bay window, is very liveable.

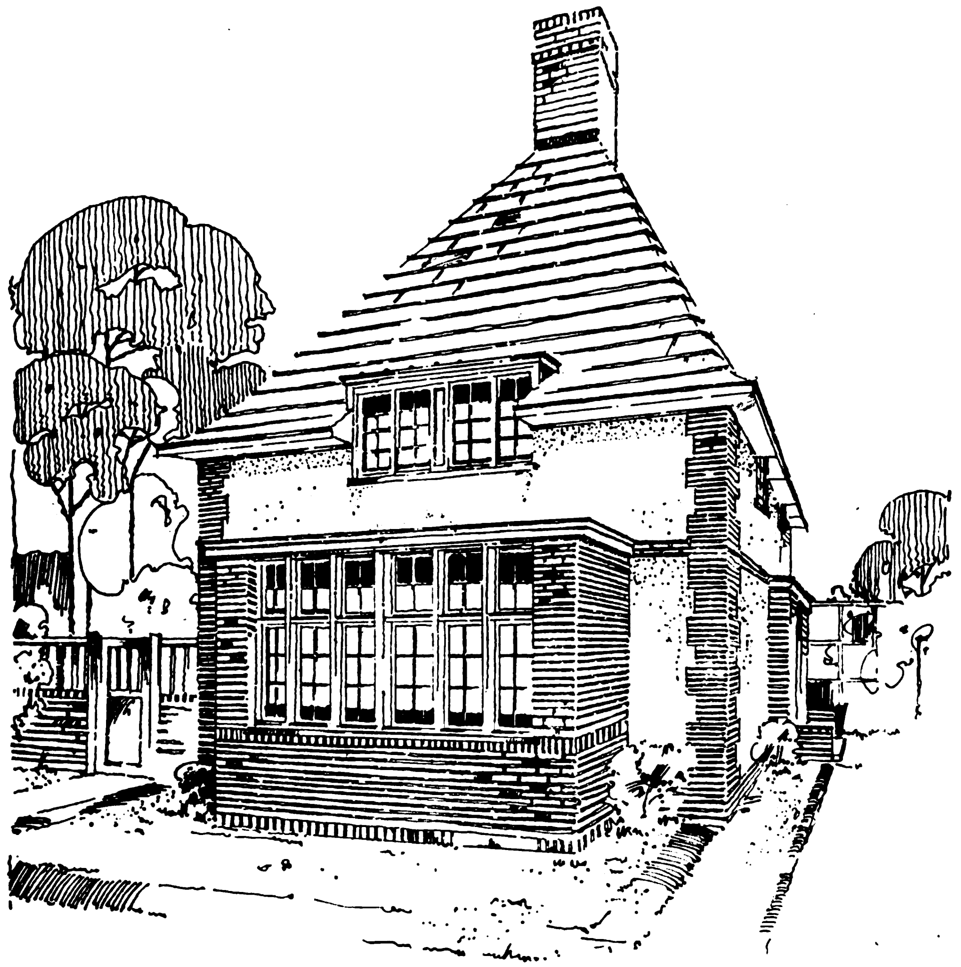
The bed-rooms are all of good size with provision for ample closet space. Every room has two windows for light and ventilation.

As constructed in Canton, under the supervision of Geo. W. Ritchie, architect, 854 Leader-News Building, Cleveland, this brick house cost $3,600. The cost should be the same in other cities of like size.

Complete working plan and specifications for this house, of brick, may be obtained for $2.00 from the Eastern office of the S-A-F-E, in the Brokaw Building, 1457 Broadway, or from the National headquarters, 354 Leader-News Building, Cleveland, Ohio.





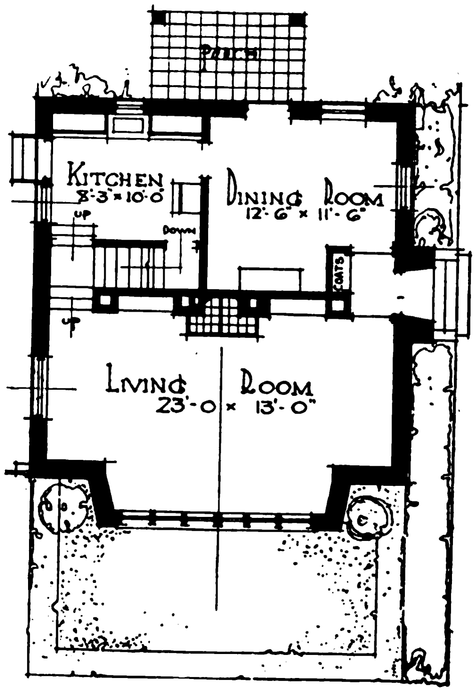


A Modern English Home

Those who have seen or read of the garden cities in England will be interested in the little house shown on this page. While not in any sense a copy, it perfectly portrays the English type of modern home for a small family.

A study of the plans will show it has many things to recommend it. First of these is the taking of the entrance from the front and placing it on the side. This allows for a big bay, which, with its many windows, answers for a sun-room during the winter months. The combination stairway is another point of good planning. The porch on the rear follows the English practice. The bed-rooms are of good size, and each has windows on two sides.

This design, which is by George S. Johnson, 10904 Amor avenue, Cleveland, Ohio, calls for the use of stucco with brick trim over hollow tile, and a tile roof, after the English specifications. This house, constructed in this manner, would cost from $4,000 to $4,500 in the Central West and would provide its owner with a safe and economical home.



First floor plan—second floor plan will be found on page 46

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., July, 1916

Priceless

COMPOSITE METAL LATH

We have had under observation for some time a metal lath which, on account of its unique construction, will, we believe, be of interest to our readers. In an interview with its manufacturers the merits of the material were set forth as follows:

This lath is practically a cloth of brick made of a woven web of No. 19 steel wire upon which brick clay is placed under heavy pressure and the whole then baked in a specially constructed furnace.

Brick or terra cotta, as is well known, has a natural affinity for plaster or cement mortar, with which it bonds freely, and it is claimed for this lath that by its use a practically homogeneous mass is obtained, the lath becoming actually part and parcel of the cement slab, in which it becomes imbedded.

As will be seen from the full-size illustration herewith, which will be found on page 55, the wire mesh is entirely enclosed in little crosses of terra cotta which hold the wire securely in place at its intersections, leaving an aperture about ⅜ of an inch square between the meshes. These little brick crosses are reduced in thickness at their joining point and along the edges in such a way that cement readily enters the apertures, but owing to the suction in the brick, as well as to the shape of the "bricklets," it is practically impossible for an excess amount of plaster to be pushed through and thus wasted.

The reduced thickness of the "bricklets" at their joining points makes the material flexible and allows it to be easily worked around corners, making the lath particularly desirable for intricate cornice work, groined ceilings, etc.

While it is obvious that this lath may be used wherever any metal lath is required, the distinguishing nature of this material indicates that under various special condi-

(*Continued on page* 55)

DOES CYPRESS, "The Wood Eternal", Last?

It Does—Until the Flames Get at It!

If you want the best library of fiction in circulation at the present period, write to the lumber associations for a batch of their business literature! If you desire to learn the fine art of making black appear white and white look any old color you please, study these lumber essays in dissimulation and observe how cold facts and authoritative statistics can be made to stand on their heads and kick their heels at the teachings of bitter experience. If you wish to see Truth attired in the togs of Baron Munchausen or the tawdry rags of Sinbad the Sailor, send for a crate of lumber logic and after digesting the slick, subtle stuff (taking care to keep it away from the wood bin, for its ignitive power is 108 per cent plus) you will be able to burn the celebrated Baron to a frazzle or do as the old time religious impostors did —take the Book of Truth, the family Bible, and by a clever citation of isolated and disconnected passages, and with as much regard for contextural exegesis as they have shown, prove by the good old Book that murder, adultery, false testimony, blackmailing, intrigue, and anything else which you please is entirely O. K. and has the stamp which proves it to have been passed by the cosmic board of divine censorship.

"Proving" the Qualities of Wood

The persistent efforts of the lumber sponsors to "prove" that wood has all the qualities of firesafe building materials—and then some —is one of the affrontatory marvels of this age of honest exploitation. One is entertained at the ludicrous "stunts" performed by the English language in the hands of scribbling lumber pamphleteers, and the peculiarly distorted work which is the fanciful product of their wood-pulp brains will some day constitute an absorbing study in perversion for the business psychologist.

But this sort of amusement dies rapidly as the mind sees that background of some 3,000 dead bodies and that ash heap of burned properties worth a quarter of a billion dollars—the annual fire loss in America!"

That John Ward House

In seeking to "prove" that wood lasts, and in inferring a durability equal to brick, terra cotta, concrete, etc., the lumbermen are scouring the earth for wood structures of ancient erection. They have spent a bag of money exploiting the John Ward House, built at Salem, Mass., in 1684. Of course the John Ward House is of wood—except the chimney, which is constructed of alien brick; and one naturally wonders how, in putting up this advertisement for the lumber cause, John Ward could have been so thoughtless and inconsistent as to have directed that the chimney be made of anything but good old lasting white pine.

Standing in the doorway of this ancient relic is a plump Miss, togged out, presumably, in the costume of

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A NEW COLORED BRICK

W. G. Bush & Co., Nashville, Tenn., are introducing an innovation in a "mat" brick of rough texture which differs from anything now on the market. It is produced in a considerable variety of tints and shades, offering the architect an opportunity to develop a range of colors unknown in brick buildings. Of importance is the fact that this new brick costs no more than ordinary face brick.

the period. In front of her stands another likeable young beauty. Naturally they are engaged in a delightful and gossipy pre-Colonial tête-à-tête. The one facing Miss Ward is complaining that her house is pestered with rats, ants, bugs and other vermin which persist in having the run of the place from cellar to garret despite all diligent efforts at their extermination. This indicates that she too is the harassed occupant of a beautiful and aesthetic dwelling of wood—haven of refuge and charitable harbor of things that creep and crawl. The writer, who was around the corner getting a drink (of water), heard Miss Ward petulantly reply that she faced the same problem and in addition was at her wits' end trying to keep old man Ward's place warm during the winter, whilst in the summer time it was "hot enough to bake one."

The opening words of the advertisement carrying this picture state that "Words could not portray the lasting qualities of white pine as graphically as this remarkable picture."

But What of the Fire Hazard?

One wonders where the John Ward House would now be if, after the pretty damsels had finished their back door chat, the original Miss Ward, in lighting the kitchen fire, had carelessly dropped her candle in the wrong place. Would not the John Ward House have made a dandy New England fire? What would "words" count for then? Loud and frantic yells for Ye Ancient Bucket Brigade! And—whilst the bucket brigade was getting on the job—it could *then* well be said that the John Ward House *was* a "graphic" and "remarkable" picture!

Salem, Mass., on June 25, 1914, was swept by a conflagration which consumed the wooden built city, causing a property loss of $14,000,000! Six persons lost their lives in the flames! The John Ward House is at Salem, Mass., and the only thing that saved it was Almighty Providence, when it caused the wind to shift. *Nuf sed!*

When such advertisements appear it is well to recall that the New England Puritan had no choice but to build of the combustible material at hand, despite the fact that he well knew the danger thus invited and appreciated the superior excellences of such firesafe materials as his former residence in England had fully acquainted him with. Lacking the means to procure brick, naught remained but to use wood.

14 Minutes of Fire vs. 1400 Years of Time

In contrast to New England one must remember the wealthy Virginia Cavaliers who so appreciated the danger involved by wood construction that they sent over to England and imported brick, with the result that to this day one may observe along the banks of the James River not one but scores of fine old brick mansions which were erected during the very early period of American history. In passing through this section the traveler imagines himself treading the streets of a fine mid-English village.

In accordance with their manifest efforts to evade and becloud the real issue, the lumber interests have recently begun to feature in their advertisements "The Oldest Door In the World," a heavily carved door in the Church of Santa Sabina, on the Aventine Hill in Rome. This door is supposed to have been installed about 1,400 years ago. Part of this advertisement reads "If a cypress door continues in daily use for over 1,400 years, and you build your new home of cypress, all or in part, how much will you and your posterity save in repair bills if put out at compound interest? (*Note: It takes more than "compound interest" to put out a fire.*) The same logic applies to present repairs or additions on structures built by people who did not learn about "The Wood Eternal' soon enough. Mansion, cottage, back fence, pergola—it's all the same."

The same argument applies to this old door as applies to the John Ward House. Also it is good to remember that as against a structure of firesafe materials, the wood house hasn't the ghost of a chance when it comes to comparison of the bills for repairs and depreciation. And if over the period of but one lifetime, leaving out your posterity, the added cost of repairing and painting any wood house was computed with compound interest, the sum which would result would easily have paid, many times, the small extra cost of building of such material as would mean the veriest minimum of depreciation during all your lifetime and that of your posterity.

A Valuable Suggestion

In their diligent though foolish hunt for antique wood, for choice building rarities, every one of which is of course an exception—which very fact predicates the arguments for firesafe materials and protective devices—the Publicity Manager of CONSTRVCTION can give the lumber men a suggestion for such material for their museum of lumber fiction as should, according to their methods of advertising, set their cypress hearts aflame with inspiration. For in their zealous hunt they have not thought of The White House at Washington. *It* is built of wood—everlasting, eternally inflammable wood; and, as the ethics of lumber advertising go, it should make the slickest display yet to be brought out.

But unless they are protected by sprinklers, vaults and firesafe furniture, heaven help the priceless relics which The White House contains if fire gets a chance at this notable structure!

Down the Back Stairway

Evasion comes generally from a cowardly or self-deceiving spirit, or from both; afraid to speak out true sentiments, or from guile concealing them. When will the lumbermen learn the folly of such apparent subterfuge? When will they learn that no one is blinded by examples which are so palpably extreme exceptions? When will they get together and, ascertaining the legitimate uses to which their product can be put, so advertise its proper channels of service? Time creeps on, knowledge advances, progress marches forward, evolution reveals better practices, improved methods, new materials, new applications of old materials. Naught can stop the trend of civilization. Wood for most building purposes is of the past. Through proper tests science has demonstrated the limitless superiority of other materials. Experience—bitter experience—has demonstrated the inferiority of wood as a material for housing human beings—everything that is of value. And the day must inevitably arrive when the spurious claims of the lumbermen will "take their silent departure down the back stairway of time."

A NEW TERRA COTTA

The Steiger Terra Cotta & Pottery Co., Mills Building, San Francisco, Cal., has placed on the market a new terra cotta building material, which gives the promise of developing a splendid field through its sound merits and wide application. The terra cotta innovation is called "Thru-an-Thru," the product being manufactured to resemble marble as nature makes it, as the coloring in the new material is thoroughly mixed through and through so that, in the event of chips being broken off, no unsightly surface or scar results to mar the effect.

In general appearance the new product is much like that of imitation Travertine marble such as was used at the Exposition last year, the great difference being that "Thru-an-Thru" is imperishable. One of the great advantages of this candidate for building favor is that it may be cut and worked over in cross section and result in highly attractive face effects. The Steiger people have arranged a display in a show window on the Bush street side of the Mills Building, consisting of two beautiful classic columns made of their new terra cotta conception. Naturally the appeal is to architects, and it is reported that the profession is highly enthusiastic over the material. Numerous inquiries have been received by the company from members of building trades and professions who are much interested in high quality building materials.

MIXER MAKES NEW RECORD

B. A. Leonard is the owner of an Ideal Cincinnatus Mixer which has gone through a unique experience, having lain at the bottom of the Ohio River, in the vicinity of Rapid Run, for a period of ninety-three days, after which it was regained, shipped to the factory for a general overhauling, and is now "on the job" the same as though naught had befallen it.

Following is Mr. Leonard's letter referring to the incident:

"I was putting a concrete lining under the limestone masonry arch in a culvert at Rapid Run, this city, and had been working about four weeks. Everything had been running smothly until one afternoon (December 18) it started to rain. When I arrived on the job the next morning all the tools were washed down the Ohio River, and the mixer was also carried down the river about 25 feet, struck a projection in the culvert and turned over and was wedged in such a manner that it could not be moved one way or the other.

"It had been in the water for 93 days before we could get it out, and I thought it would be a total wreck and beyond repair. I was agreeably surprised, to say the least, to learn what the expense was for repairing the mixer, as I had figured that your bill would be twice as much. I received the mixer to-day from your factory and it looks and acts like a brand-new machine."

GREENWOOD FOR CO-OPERATION

Cites Attitude of Industrial Germany

G. W. Greenwood, of Uniontown, Pa., president of the Eastern Paving Brick Manufacturers' Association, which held its quarterly meeting at the Fort Pitt Hotel, Pittsburg, Pa., recently, offered some constructive suggestions which well apply to all industries relating to building.

Touching on the need for a more reliable method of estimating, Mr. Greenwood said: "We are still in a state where we guess at what our competitors are going to bid on a definite job, and then bid just as much lower as we deem it necessary in case we are in need of that particular work. This makes it possible for the purchaser to play one man against another, to the pronounced disadvantage of both.

"Information from one manufacturer should be more reliable than information from the purchaser. This condition will not come very quickly, but repeated association in meetings will produce it in groups as suspicion and distrust evaporate, until finally the pressure of opinion will curtail unfair methods of competition."

Assistance of Federal Commission

Continuing his argument for co-operation through association, he stated that great assistance might be derived from the new Federal Commission, for, from it, as an association, while "it might not be possible for all members to send each a representative to the commission, or for the commission to see all the representatives individually, still if one or more representatives of the association were to get in touch with the commission, it would pave the way for continued co-operation between the two bodies;" and with the result to be expected "new points could be suggested to be taken up with the commission before the next meeting of the association."

"The attitude of the commission towards associations such as ours is indicated in the following paragraph from an address by Commissioner Harris last Tuesday:

" 'Concerns engaged in the same industry have much in common in improving processes of manufacture, standardizing products, establishing systems of accounting, obtaining credit information, and promoting the welfare of employees.

" 'By exchanging ideas, you broaden your outlook of business as a whole, and your combined knowledge and experience helps to solve many difficult problems.

Germany's Policy of Co-operation

" 'Germany's success as a commercial world power is due very largely to the policy of organizing and co-operating. Her business men have worked together. They have established communities of interest among themselves for the mutual purpose of promoting trade at home and abroad. They have organized in every important industry trade associations, and into these are gathered 85 per cent of the manufacturers engaged in the respective industries. This has proven to be the very backbone of Germany's industrial and commercial achievements. More than 600 associations of manufacturers, producers and merchants exist in Germany to-day, and in addition to these there are about 5,000 subsidiary business organizations. The German Government not only sanctions these industrial organizations but assists them in many ways.' "

* * *

America sometime will learn
That wood to build is wood to burn.

"CONCRETE AND REINFORCED CONCRETE"

Under the above title, Walter Loring Webb, C.E., consulting civil engineer and author of several books; and W. Herbert Gibson, B.S., C.E., consulting engineer and specialist in re-inforced concrete, both members of the American Society of Civil Engineers, have, through the American Technical Society, Drexel Boulevard and Fifty-eighth street, Chicago, brought out a condensed practical treatise dealing with concrete construction problems, including beam and slab design construction work, cement mixtures, tests, retaining walls, etc. The volume, copyrighted, measures 4½ x 7¼ inches—a handy size for pocket use—is well printed and bound with flexible cover. Numerous line and halftone illustrations appear throughout.

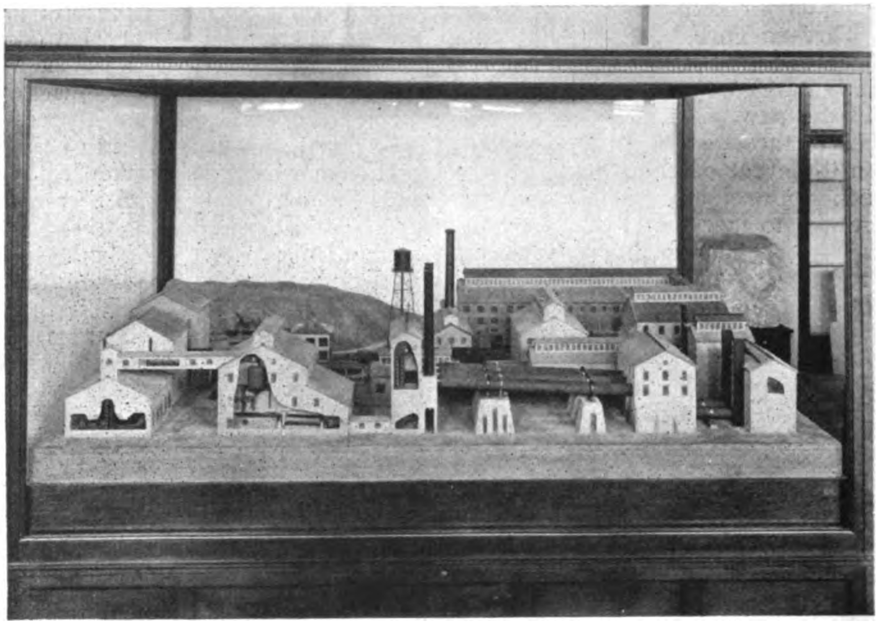
The interest of the professional and general public in concrete construction should warrant a large circulation for such an authoritative yet condensed book; for the authors have striven to present the subject in a simple and concise way, convenient both for engineers and students. The entire text, including of course that portion relating to the fireproofing qualities of concrete, is written so as to render practical information without wasting time reading elaborations and other verbiage.

"Concrete and Reinforced Concrete" well merits a place in every public and engineering library, as well as amongst the reference books of students and practicing engineers.

Amongst the subjects discussed are: Methods of management, material costs, accurate estimating, correct checking, discrepancies in cost of forms, inaccuracies of "cost data," variations in labor costs of different members in concrete form construction, etc. The argument is for a full knowledge of unit costs as against guesswork and bulk costs. Such a system involves the adoption of factory methods in construction. The need of this management is being recognized, but only to a limited degree. Full economy will only be attained as rule-of-thumb methods are discarded and the job is considered with a view to thorough analysis in planning functional methods and a complete study and arrangement of details.

MODEL PLANT MAKES AND ADVERTISES PORTLAND CEMENT

The Division of Mineral Technology of the National Museum at Washington, D. C., in connection with its educational exhibition plans, has just completed a model, covering 80 square feet, which is a miniature of a real cement manufacturing plant, so designed as to permit the visitor to follow in their successive stages the various processes of Portland cement making by walking around the model. Persons who have inspected the layout are enthusiastic in their commendation, saying that one may learn more in half an hour by looking at this model than is usually gleaned by passing a day in a real plant.



Model of cement manufacturing plant. National Museum, Washington, D. C. Division of Mineral Technology

At one end of the model a cement rock (limestone) quarry is shown, with drills at work and steam shovels loading cars. Along the sides of the quarry are the raw rock crusher building, rock storage house, and the driver structure, each with part of their walls cut away in order to permit a view of the machinery within. That the visitor may gain a conception of the process rather than an appreciation of the magnitude of the manufactory, and in order to avoid confusion, a single unit of the manufacturing process is shown at a time. As an illustration, in the raw rock crusher building, one gyratory crusher is set under the rock bin. An elevator carrying the crushed product to the top of the building, and a belt conveyor delivering the product to the crushed rock storage house next adjoining is shown. From the bottom of the building in which the rock is stored another conveyor takes the material to the following building, where it is dried.

Next is the raw mill, where the dried rock is pulverized; then the kilns to burn the pulverized rock, the result being known as "clinker." Following are the coolers and clinker storage houses. The third side of the model is devoted to the gypsum storage house, where is kept the crushed gypsum which is added to the clinker to retard the setting time of the finished product. And last is the grinding mill. Here the clinker and gypsum are pulverized, the result being Portland cement, which goes on to the stockhouse, and lastly into the packing rooms.

Portland cement was first discovered by an English bricklayer. In America the industry began in the Lehigh valley of Pennsylvania, mainly in Lehigh and Northampton counties.

COMPOSITE METAL LATH

(*Continued from page* 51)

tions it can be used to great advantage.

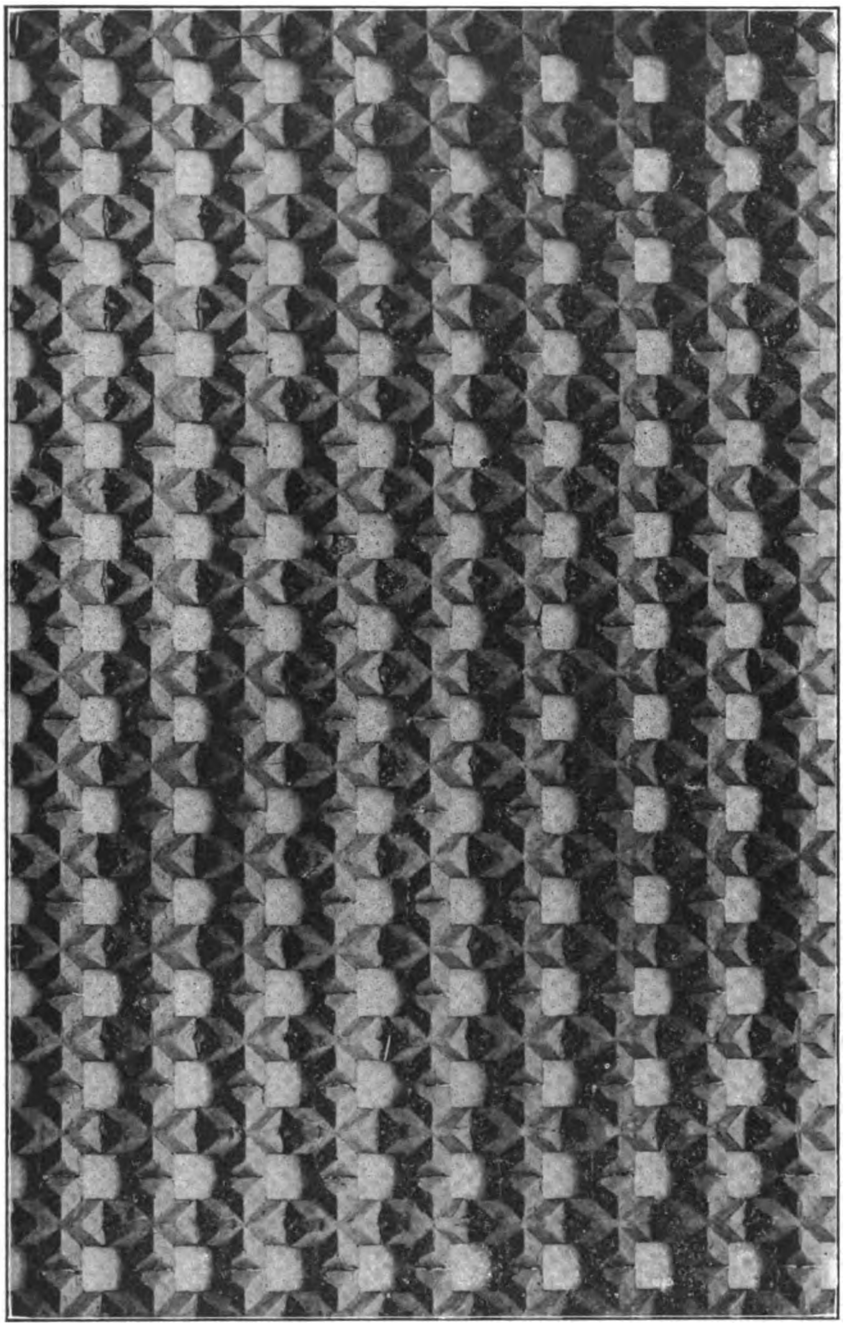
For thin partition walls, for which there is at present such a growing demand, this lath will be found particularly advantageous as a plastering base. Erected on angle or channel iron it may be plastered on both sides, with the result that the whole slab from one side to the other becomes a solid mass, the bonding being complete at all points, the bricklets becoming an integral part of the cement wall. This feature makes the lath also advantageous in hollow wall partition work, where it may be erected on both sides of a 1½-inch or 2-inch channel iron as a substitute for the usual hollow tile or gypsum block, thus obtaining the same air space with a much thinner wall, and saving the weight of the hollow tile or block. This saving in weight amounts to at least 10 or 12 pounds per square foot of wall as compared with the 4-inch hollow tile, the saving in the thickness of the wall being at least 2 inches.

The bonding feature of this lath brings it into prominence at once for use for stucco and all outside work. The lath is attached to the sheathing or other support by heavy staples or wired around the bricklets which become embedded in and actually part of the cement slab. The whole stucco sheet is thus firmly and permanently fastened to its support and cannot be affected by possible rust.

A further very interesting and novel use has been made of this lath in surfacing concrete for plastering or for tile and mosaic work. For this purpose the lath is laid over the forms and the concrete poured upon it; when the forms are removed it is found that the concrete, besides forming buttons through the openings, has firmly bonded with the bricklets and a surface of terra cotta is presented upon which to plaster, thus doing away entirely with the very expensive and quite unsatisfactory roughing which has heretofore been necessary in order to form a bond with the plaster. This lath has been used in this way in the subways of New York in stations where plastering, tiles, etc., are required.

In laying mosaic floors the lath can be used with great advantage, and is found to entirely prevent the separation of the mosaic sheet from the concrete, which is so often the case.

The fire-resisting qualities of this lath are of course assured through its very manufacture, the material being passed through a temperature of about 1,700 degrees Fahr. in its manufacture.



The New York Edison Company, and other users of high tension current, have taken advantage of this feature and are using the lath in fireproofing their high tension cables. For this purpose they cut the lath into strips about 3 inches wide, winding it spirally about the lead cables. Upon this base they wipe a 2 to 1 mixture of cement to the thickness of about ¾ inch. Laboratory tests have shown this method of fireproofing to be far superior to any other method and very much less expensive than asbestos or other coverings which have been used in the past.

The first cost of the material compares very favorably with any good metal lath, and in addition it is claimed that great economy of material and labor is found in its use.

In plastering on walls and ceilings there is practically no "drop," the suction in the brick being sufficient to seize and hold the plaster as it is applied. A cement mixture of 3 to 1, instead of 2 to 1, may be used to advantage with this lath, as it is obvious that any metal lath depending solely on the clinch for its hold on the lath demands a much stiffer mixture than plastering on terra cotta.

While C.M.L. Brick lath is a practically new material in this country it has been used in Germany for a great many years and has stood the test of time. German methods of manufacture made it, however, impractical to market the lath in this country, and the Composite Metal Lath Company has been devoting itself for the past two years to developing new methods for reducing costs and improving the material to make it available for the demands in this country.

While the lath is fundamentally exactly the same as that so well known throughout Germany and in England and France, the improvement in manufacturing methods now enables the company to offer the material in competition with any of the standard laths in this market and far below any of the galvanized or specially protected laths.

MERCHANT & EVANS TRADE REMINDERS

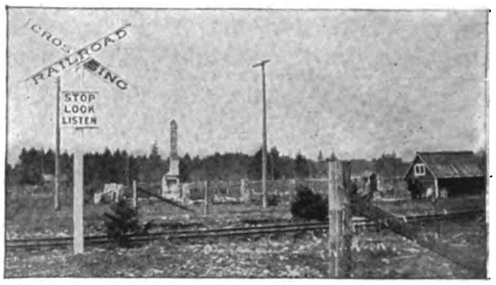
Wide awake business houses know the value of persistency, of keeping customers and prospective customers constantly reminded of their service. This is especially true of large concerns doing a national business in a variety of articles.

We have just received from Merchant & Evans seventeen different new pieces of advertising literature, ranging from a series of two-color blotters and return cards relating to ventilators, roofing tin, galvanized materials, mixed metals, clutches, alignment joints and tin plate to well printed folders and elaborate broadsides telling the service of the Merchant & Evans well known line of Gothic shingles and metal Spanish tiles, their Star ventilators, and a complete line of fire protection and fire prevention devices and materials, including the approved "Evans" Almetl fire doors and shutters, automatic sprinkler heads, "Evans" alarm-valve with retarding chamber and both electrical and mechanical alarms, etc., etc.

Architects, engineers and others having to do with proper fire prevention and protection equipment would do well to ask for a free copy of a carefully-worked-out "Chart for 'Evans' Almetl Fire Doors, Single or Double; Either Sliding (inclined track) or Flush and Overlap Swinging."

The Merchant & Evans Company this year celebrated its fiftieth anniversary, having commenced its service back in 1866. The company maintains offices and representatives in all principal cities, operates three mammoth factories at Wheeling, Philadelphia and Chicago, with main offices and warehouses at 2019-2035 Washington avenue, Philadelphia, Pa., where all inquiries regarding fire prevention engineering receive authoritative and prompt replies.

"STOP— LOOK— LISTEN"



Denison Interlocking Tile Cor.

Here is something to cause the home builder to Stop, Look and Listen:

The brick chimney is all that is left of a beautiful frame residence in the State of Washington.

H. S. Wheeler, of the Far West Clay Co., says in connection with this photograph:

"It teaches a very valuable lesson. Home builders have come to the crossing. They should *Stop* to consider a moment the crime of a non-fireproof house. They should *Look* at the devastation that has been wrought through the agency of fire. They should *Listen* to what the Clay Products Manufacturer has to say about preventing such losses."—*The Interlocker.*

A FOURTEEN-STORY STUDIO BUILDING FOR NEW YORK

The old Washington Square section of New York City is to have a new fourteen-story studio building, replacing several of the old-time structures, and designed by Architect Charles W. Buckham to meet the requirements of artists. The cost will approximate $750,000, and the structure will be located on the south side of the Square. It is the most pretentious and serviceable apartment house project which has thus far been planned for this old residential district. The building will be operated on a co-operative plan, which is intended to relieve the owners of the trouble and expense of management and filling vacancies, at the same time assuring a definite income.

The structure will occupy a plot 70 feet on Washington Square and 164 feet on Thompson street. That section facing the square will be wholly laid out in studio suites for artists; the remainder of the building being planned for suites of two to four or six rooms. The co-operative method enables each tenant to purchase his apartment outright, so that he may have it arranged and decorated according to personal taste. This, of course, provided the apartment is selected before the building is finished. The interlocking system makes it possible to arrange the suites either single or double. The duplex connecting system affords a highly efficient opportunity of enlarging or decreasing the apartment space as required by the needs of occupants. It is believed to be the first time such an idea has been worked out in the fine detail revealed by the plans of Mr. Buckham, who has arranged the structure according to the Gothic period. The façade is to be in light face brick and terra cotta.

DENISON INTERLOCKING TILE CORPN

The organization of the Denison Interlocking Tile Corporation, Cleveland, O., with a capital stock of $500,000 has been announced. The new company represents the consolidation of the Denison Tile Engineering Company and the Interstate Clay Products Company, both Cleveland concerns. Robert Gamble is president, Bert J. Graham, president of the International Clay Products Company, will be vice-president and general manager of the new organization, and Burton J. Mitchell is secretary and treasurer. These men and the following make up the board of directors: J. A. Maahs, secretary and treasurer of the Pennsylvania Fireproofing Company, R. S. Renkert, treasurer and general manager of the Metropolitan Paving Brick Company, Telfair Stockton, president of the Gamble & Stockton Company, and H. H. Titsworth, president of The Clay Products Company. The new corporation will occupy offices in the same building as was occupied by the companies now merged—the Hippodrome Building. The interlocking tile business started five years ago in Cleveland, and has now expanded until the concern has twenty-six factories and over sixty sales offices in the United States, besides several in Canada. An advertising and sales campaign which is planned to reach the markets of Europe and South America is now being arranged.

CEMENT IN THE LUMBERYARD

About ten years ago the amount of cement sold by the retail lumber dealer totaled less than .07 per cent. Due to publicity, advertising, and other exploitation, this amount has been greatly increased, until the percentage now runs more than 15 per cent! And cement manufacturers do not intend to remain satisfied with this figure, as they plan to make their product the *leading* item in the retail yard. Should the makers of brick, hollow building tile, metal lath, etc., determine to do the same, there is no question but that the sales of firesafe materials would take a perceptible jump, and, as CONSTRVCTION has before mentioned, the lumber yard would speedily become a "building supply yard." In many instances the old name is now a misnomer.

The new Milwaukee Athletic Club, a $600,000 project, the general contract for which is held by the Foster Construction Company, Milwaukee, Wis., calls for estimates on 580,000 common brick, 480,000 hollow brick, 173,000 feet of 4-inch partition tile, clay or plaster block, and 145,000 feet 10-inch floor tile.

FIRE-RESISTING TESTS

The Bureau of Standards is conducting a series of tests to determine positively the fire resisting qualities of various building materials, the purpose being to ascertain the effects of fire upon full sized wall members ordinarily used in building construction. A panel furnace has been erected and given a tryout on a large test panel of fire brick.

FIRE BRICK HAS GOOD MARKET

The European war has had a beneficial effect on fire brick manufacturing, as the material is an important requirement in the metal working industries which have advanced to unheard-of activities as a result of the conflict. 1913 and 1914 were slim years for the fire brick trade as well as other lines, until the metal industries began to move and start demands for fire brick.

MAMMOTH LOS ANGELES WAREHOUSE

Contractors are now at work demolishing structures occupying a 32-acre tract on which will later be reared one of the most extensive warehouse projects ever undertaken on the Pacific Coast. This vast enterprise will be commenced by the Los Angeles Union Terminal Company. The proposed building, which will be practically one structure, will cover most of the tract. An elaborate system of spur tracts and subsidiary transportation devices are planned in connection with the undertaking. In all eighty-four buildings will be demolished. These include a brick warehouse, a church, many apartments and hotels, and a considerable number of dwellings.

UNIT COST IN CONSTRUCTION

Construction companies say a contractor does not begin to make money until he gets his third job, provided he is at the game as long as this. The first contract costs him more than his estimate; he bids low on the second, believing he sees where the first money was lost; but on the third Job he knows he has been a fool and adjusts his bid accordingly.

The above paragraph is one of the interesting and instructive assertions in a paper on "Unit Cost In Construction," read by Sanford E. Thompson, consulting engineer of Boston, Mass., before the American Concrete Institute. The aim of the paper is to call attention to the necessity for more accurate estimates by architects, engineers and contractors, and to the posibility of reducing construction costs by a more thorough analysis and systematizing of the labor operations.

NEW YORK BUILDING ACTIVITIES

In 1877 there were 1432 buildings planned in New York City, estimated to cost $13,365,114; in 1869 the number planned was 2342, estimated to cost $40,362,058, and in 1909 the building construction planned involved an estimated outlay of $186,047,477, but the city in the last named year embraced five boroughs instead of one.

Every Man Who Boosts His Industry Helps His Own Business; Every Man Who Knocks His Competitors Depreciates the Industry of Which Both He and They Are a Part; and Though He May Not Know It, That Man Places a Stumbling Block in His Own Pathway

EVERY CITY SHOULD HAVE A BUILDING CODE

This fact has been recognized for a long time but it has not been an easy matter for city authorities to procure a workable code. Many cities have spent large sums of money on building codes which have been the source of much trouble to enforce and that had been necessary to constantly revise to make them practical.

For the first time there is placed at the disposal of every municipality a suggestive code that has been found to be practical in actual use and which may easily be adopted to either the smallest or the largest city in the United States.

This code was written by Virgil G. Marani, civil and consulting engineer of Chicago and widely known throughout the country as an authority on building codes. Mr. Marani was formerly the building commissioner of the city of Cleveland. He has written codes for numerous cities and it was to meet the constant demand upon him for information along this line that he prepared his suggestive code, copies of which have just come from the printer.

There are many original features about the new Marani code, both in its text and its arrangement. The code is published in ten small volumes, each treating with its own subject. This feature means economy to the city using the code, since it is necessary to give only the section in which the prospective builder is interested, instead of giving him the complete code. Mr. Marani divides his code in ten titles as follows:

Title 1. General Index, Administration, Fees.
Title 2. Divisions, Engineering, Reinforced Concrete.
Title 3. Class I Buildings.
Title 4. Class II Buildings.
Title 5. Class III Buildings.
Title 6. Class IV Buildings.
Title 7. Chimneys, Gas Fittings, Plows, Heating and Electric Wiring.
Title 8. Plaster and Laths.
Title 9. Gasoline Storage, Garages.
Title 10. Plumbing.

From these classifications it will be seen that the person who appeals to the building department for information regarding a residence will be interested only in the pamphlet dealing with fourth-class buildings. Without any reference to the other sections he will find full information regarding the construction of this type of building. While this method means repetition in a good many cases it still avoids possible confliction and brings all the information regarding each title to one place.

Mr. Marani's classification of buildings is interesting. Class I includes "fully protected" buildings, generally known as "semi-fireproof." Class II includes the "partially protected" buildings, generally known as "semi-fireproof" or slow-burning. Under this classification the author includes buildings of mill construction equipped with approved automatic sprinkler systems. Class III buildings, ordinary construction, viz., buildings with masonry walls and interior of ordinary frame construction. Class IV, buildings entirely of inflammable material. Buildings of class three and class four may be "temporarily protected" against fire or "not protected," but when "temporarily protected," under the meaning of this code they are permitted a greater height and a greater floor area than buildings of this kind constructed without such protection.

In this way, Mr. Marani's code encourages the better class of construction, since it rewards the builder who takes fire protection into account.

Another distinct feature of Mr. Marani's code is the wide variety of materials permitted.

The following is quoted from the administrative section of the code:

"Much desired and wider recognition has been given to the proper and sane use of the following materials for roof, floor and enclosure construction, for protection of steel, for incombustible partitions and incombustible lath in all buildings: Hollow Building Tile, Hollow and Solid Gypsum Tile, Hollow Cement Blocks, Gypsum Plaster Board, Gypsum Plaster fillers, Metal lath, Gypsum for the protection of steel, etc.

"The more general use of this material following present standard engineering and architectural practice will encourage a better and less combustible type of construction and also have a tendency to reduce the cost of building that are fully protected (fireproof) construction.

"Class four buildings, when not protected, should not be allowed within the fire limits of municipalities, or if such fire limits are thickly populated and congested, any building of class four should be protected within these limits."

The most fortunate thing about Mr. Marani's code is that it is available for cities everywhere without cost. Mr. Marani invites correspondence with everyone seeking the new code. In giving away this code, Mr. Marani is not doing a service to any particular material, as the door of the code is open to every material, each in its proper place. His aim is to aid the cities and enforce the proper restrictions and encourage better type of building without increased cost to the builder.

Many small cities throughout the United States who have no code will do well to get in touch with Mr. Marani and secure a copy of this code. His address is 205 West Monroe street, Chicago, Illinois.

Not a Thorough Job

"Come, all you, and be baptised," cried the chocolate evangelist.

"But Ah've been baptised by the Presbyterians," said Rastus.

"Lo'd," cried the Baptist minister, "yo' only been dry cleaned."

One for the Girl

"Girls make me tired," said the fresh young man. "They're always going to some of these palmists to have their hands read."

"Indeed!" said she sweetly. "Is that any worse than men going into saloons to get their noses red?"—Exchange.

THE "REX" PRODUCTS

Flintkote Manufacturing Company, of Boston, Mass., has just sent in an attractive and valuable catalogue of roofing products. This catalogue contains not only descriptions of the various excellent products manufactured by this concern, but contains many views of finished roofs and careful directions for laying.

Accompanying this catalogue is a carefully prepared sample book containing 12 samples of the actual materials, varying from slate surfaced shingles to waterproof paper.

This sample book and catalogue should be in the files of those interested in roof construction.

TWENTY-FIVE YEARS OF SUCCESS

At a meeting of the board of directors of the Bostwick Steel Lath Company of Warren, Ohio, held on Wednesday, June 14th, to commemorate the quarter-century anniversary of the business, due tribute was rendered W. G. Hurlbert, Sr., president of the company ever since its establishment.

The meeting took place in the offices of the company, where the following officers and directors were re-elected: W. G. Hurlbert, of Warren, president and treasurer; John P. Hazlett, of Youngstown, vice-president; C. P. Wilson, of Niles, secretary; W. G. Hurlbert, Jr., of Warren, assistant secretary and treasurer; J. W. Bowman, of Pittsburgh, and Joseph Smith, of Niles.

The secretary then read a report showing a very successful year, after which the regular yearly dividend was declared. Most interesting was the summary of Mr. Hurlbert's successful career of twenty-five years of business achievement, fittingly concluded in the directors' gift of a beautiful parlor lamp as a token of their good will and esteem.

The Bostwick Steel Lath Company is well and favorably known all over the country, by reason both of its extended existence and the proven excellence of its products. The plant is located along the Erie tracks at Niles, northward of Heaton avenue, and covers seven acres.

REAL RECORD PROTECTION

To provide for the protection of its records, the Metropolitan Life Insurance Company, about ten years ago, constructed a fireproof storage building within the corporate limits of the city of Yonkers. The building is on a plot of one acre owned by the company, so that no other building may be erected near it and increase the fire hazard. It is of steel, brick and concrete, and the filing cases, doors and interior fittings are of metal. It has an area of about 10,000 square feet in each of its two stories, and it is considered absolutely fireproof. In appearance it resembles a large country home.

The latest instance of the destruction of historic documents was due to the burning of William Smith Hall, Washington College, Chestertown, Md. The flames spread so rapidly that the documents in the archives could not be saved. The library of the college was destroyed also.

CO-OPERATION

A Striking Editorial from General Fireproofing

The following editorial from the July issue of *General Fireproofing*, the interesting house organ of the General Fireproofing Company, Youngstown, Ohio, shows the modern spirit of the modern, broad-minded and far-visioned manufacturer:

No one denies that the greatest achievements of modern times, in both applied art and commercialism, are the result of co-operation. This has become "public opinion," which no doubt accounts for the use and sometimes abuse of the word co-operation in practically every line of merchandising and service work.

Nor does the building industry, in any of its many branches, escape this cry of co-operation. But all of us can be proud to know that, in building, the percentage of abuse is exceedingly small. The greatest developments in building methods and materials have been due to close co-operation among architect, contractor and manufacturer. The advance of terra cotta, of steel, of reinforced concrete and most lately of expanded metal laths and reinforcements and of waterproofings, are all examples of this wholesome work-together spirit.

It is now generally conceded that in developing building materials and the method of applying them the interests of architect and manufacturer are identical. And this seems perfectly natural, for each of us gains the greatest individual profit by it. From our standpoint, co-operation encourages your interest and secures the specifications which bring business. From yours, co-operation secures the kind and quality of materials upon which your reputation and future may safely be built.

Still there are, perhaps, two grades of co-operation: one whole-souled, hearty, confident; the other half-hearted, vacillating, cunningly reserved.

If growth and good-fellowship are to continue, there will be no room for this last brand of co-operation. The architect has a right to demand loyalty *with* cooperation and the manufacturer must realize that he cannot usurp the designers' or builders' functions without detriment to his business welfare.

Note: *General Fireproofing* may be had regularly free of charge from the General Fireproofing Company. It is a cheerfully, snappy little publication, designed to occupy but a few minutes of the busy man's time and is well worth sending for.

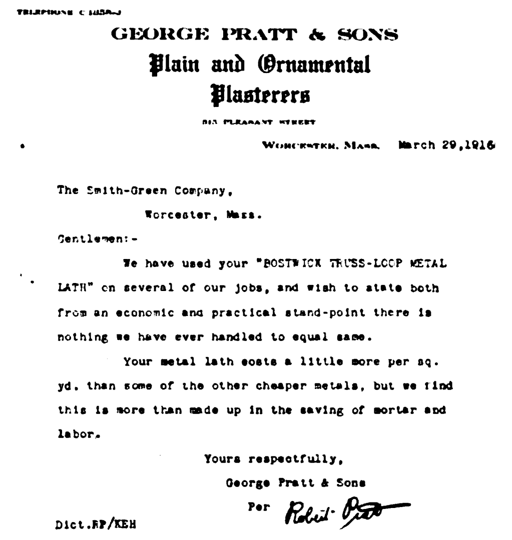
The Sandusky Cement Company, Cleveland, O., has just issued an attractively printed and practically illustrated booklet entitled "Waterproofing on the farm," which should be of considerable usefulness to a class of people who, perhaps more than any other property owners, are constantly adapting cement and concrete to their lands and structures. The booklet is sent free on request. Besides farm owners, it should be read by concrete contractors specializing in rural work. The Sandusky Cement Company manufacture the famous Medusa brand of cement and waterproofing.

According to the London *Builder*, the word "architect" first appeared in English in a book by John Shutte, in 1563.

There was a bright man in Ky.
Used unburnable shingles—t'was ly.
The danger of fire on shingles of wood
Was a subject that he very well understood.
Note:—What a sensible duck-he!

"BOSTWICK TRUSS-LOOP" METAL LATH

is not only fire resistant but, but also economical. See what a practical man says—



TELEPHONE C [illegible]

GEORGE PRATT & SONS
Plain and Ornamental
Plasterers
[illegible] PLEASANT STREET

WORCESTER, MASS. March 29,1916

The Smith-Green Company,
Worcester, Mass.

Gentlemen:-

We have used your "BOSTWICK TRUSS-LOOP METAL LATH" on several of our jobs, and wish to state both from an economic and practical stand-point there is nothing we have ever handled to equal same.

Your metal lath costs a little more per sq. yd. than some of the other cheaper metals, but we find this is more than made up in the saving of mortar and labor.

Yours respectfully,
George Pratt & Sons
Per Robt. Pratt

Dict.RP/KEH

THE BOSTWICK STEEL LATH CO.,
NILES, OHIO

Your Home is Known by the Company it Keeps

The selection of a site is all important.

When you buy, rent or sell real estate of any kind our services will help.

Our three offices offer unusual facilities to every client.

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BRANCHES:
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One-half of a Brick is Service

You not only need brick for your Building Operation but you must have them when you want them.
We have anticipated the demands of a growing city. Every year we increase our output and our service equipment.
We are now prepared for 1916 BUSINESS.

The Farr Brick Co.
Leader-News Bldg., Cleveland

REYNOLDS FIRE SAFE SHINGLES

APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK
H.M.R.
ESTABLISHED 1868

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

UNDERWRITERS LABORATORIES INC.
INSPECTED
ROOFING MATERIAL
CLASS E
ISSUE No. 12

If your dealer cannot supply you write the factory.

H. M. Reynolds Asphalt Shingle Co.
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

Close These Doors

—and each room immediately becomes a segregated unit—fireproof and firesafe. Dahlstrom Metallic Doors and Trim provide the convenience of communication in office suites to the exclusion of all fire hazard. Apart from wear-proof and fire-proof service they also contribute to the aesthetic requirements of the fine building. The baked-on enamel finish is equal in appearance to the finest woods from the view point of both grain and coloring. This finish is also elastic, sanitary and easily cleaned. Write for all the facts.

DAHLSTROM METALLIC DOOR COMPANY

Executive Offices and Plant

61 Blackstone Avenue : Jamestown, N. Y.

New York Office, 130 East 15th Street **Branches and Representatives in All Principal Cities**

STUCCO HOUSES
Cost Less Than Frame

Would you like to know how to build a **Stucco** house at less cost than frame?

Would you like to know how to save **33⅓** per cent in cost of the wall construction and get a fire-safe, more attractive, more durable house?

Then write to us today for full information, booklets and cost data on Stucco houses.

Let us prove our claim to you.

The Cleveland Builders Supply Co.
Cleveland, Ohio

for

Converts to Cooperation

Analyze this and the past numbers of Constrvction

Then ask yourself if you ever heard of anyone doing such real service for the fireproofing cause. It is our conception of vital boosting—this jumping right into legislative battles and fighting for ordinances favoring the use of fireproof material in building construction.

CONSTRVCTION is the only publication wholly devoted to consistent fireproofing—it is actively fighting for its constituents—it wants to be measured by the value of the good it accomplishes for your product.

Subscribe for CONSTRVCTION
Get Your Associates to Do Likewise

Help Us to Help You

Fireproofing Information Bureau

¶In establishing this complete reference service, manufacturers and others producing catalogs, house organs, price lists, etc., are requested to forward their printed matter and samples and place CONSTRVCTION on their permanent mailing lists.

¶The FIREPROOFING INFORMATION BUREAU is intended for the use of resident and visiting architects, engineers, contractors and the general business and professional firesafe building fraternity, as well as prospective building owners, to whom its use will be extended gratuitously.

¶Every effort will be made to develop and maintain this Bureau to a high point of efficiency.

¶Prompt coöperation is solicited.

"CONSTRVCTION" TIMES BUILDING New York City

.. *The* ..

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BRICK and TILE

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SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

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DEALERS IN

BUILDERS SUPPLIES
and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const.Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

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HIRD AND NICKEL PLATE
LAKEWOOD, O.

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Conditions for building never will be more favorable than at the present time.

Let your dream of that Safe Home be realized this year.

We sell every material for the Fire Resistive Building.

Service the best.

Cuyahoga Builders' Supply Company

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CLEVELAND, OHIO

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FOR FIREPROOF HOUSES

FLOOR ARCHES AND ROOF BLOCKS

RARITAN

PARTITIONS AND WALL BLOCKS

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RARITAN CLAY PRODUCTS COMPANY

OF NEW YORK

220 East 138th Street

Advertising and Ethics

Advertising is a factor of constantly increasing power in modern business; and it affects the public very vitally. The agencies for the dissemination of advertising have increased remarkably. The use of advertising from sporadic efforts has developed into sustained and carefully directed campaigns. Luxuries, through insistent suggestion, become the necessities of a nation.

Advertising has wrought and will continue to create miracles in public opinion. It has become a matter of paramount importance to all phases of industry, from the processes of extraction of the raw material to the final distribution of the finished product; and it has become no less a matter of very serious concern to the public.

For business men, therefore, to consciously seek to establish and enforce a code of ethics, based on truth, that shall govern advertising, methods, and effects is splendidly significant. It augurs permanence and stability in industrial and distribution methods because it is good business judgment; and, more than that, it indicates a fine conception of public obligation on the part of men in business, which is one of the inspiring things in our outlook upon the future of national conditions and institutions.

TRUTH

This article—one of a series to advertise Advertising, by the Associated Advertising Clubs of the World (headquarters Indianapolis)—was written by

HON. JOSEPH E. DAVIES,
Chairman Federal Trade Commission,

who further says:—
"The Associated Advertising Clubs of the World are to be congratulated upon the splendid manner in which they are seeking to build up business ethics from within."

Serves more people in more ways than any other Institution of its kind in the world.

J-M Asbestos Roofings

prove the service they will give you by the service they have given others

J-M Asbestos Roofs have been in use on many manufacturing and industrial plants from twenty to thirty years without a cent for upkeep.

They are still in excellent condition and are good for many more years of water-proof, fire-resistive roofing service.

Johns—Manville
ASBESTOS
"The Registered Roofing"

As these roofs are made only of Asbestos and Lake Trinidad Asphalt they do not break down, but are practically permanent. They never need coating or painting or any other attention, so that their first cost is their only cost.

J-M Asbestos Roofings are made in several different forms. One of these is best suited to your requirements. Our engineers will be glad to advise you upon receipt of a statement of your needs.

J-M Asbestos Roofinings are furnished in two forms; built up when a monolithic roof is required, and ready for roll form.

J-M Asbestos Roofings are examined, approved, classified and labelled by the Underwriters' Laboratories, Inc.

H. W. Johns-Manville Co.
Executive Offices, 296 Madison Ave., New York
Boston, Chicago, Cleveland, New York, Philadelphia, Pittsburgh, Toronto, St. Louis, San Francisco, Seattle

POMEROY FIRE RETARDANT WINDOWS

Not Made to Meet a Price, but to Set a Standard of Service

"Character, or that which distinguishes one man from all others, cannot be supposed to consist of one particular virtue, or vice, or passion only; it is a composition of qualities which are not contrary to one another, in the same person."
—Dryden

The "character" of Pomeroy Windows lies not in any freakish or patented construction, nor in any one structural detail. It consists rather in the intelligent combination of the best conception of approved window practice growing out of twenty years of window specialization. Among the factors contributing to this Pomeroy character are: A clear comprehension of the functions of a window as a permanent feature of building equipment; an understanding of, and provision against, the common faults of cheap, "tinker" construction; a simplicity of design which minimizes trouble-possibilities; a quality of materials that is a guarantee of serviceability; an efficiency which permanently combines dust-and-weather-proofness with easy operation; an idea of economy which places last cost before first cost, in importance; a service designed to protect the interests of architect and owner.

Ask Us To Show How and Why

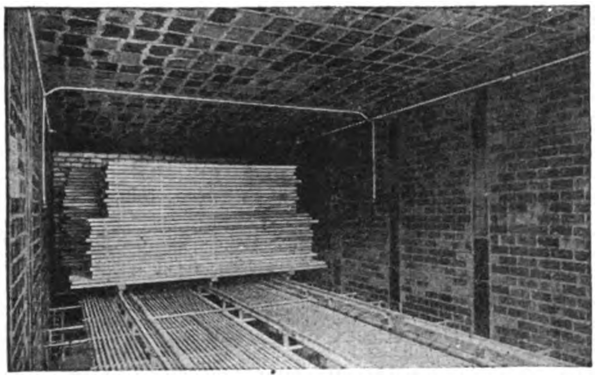
SAMPLES FILED WITH ARCHITECTS SAMPLES CO. NEW YORK CITY

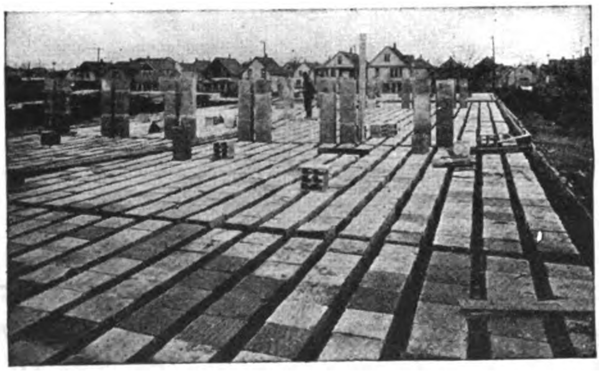
S. H. POMEROY COMPANY, INC.
30 EAST 42ND STREET NEW YORK

WHAT WOULD YOU ADVISE—

if the Packard Motor Car Company asked your opinion on the most modern method of dry kiln construction? The Grand Rapids Veneer Works, Engineers, said

NATCO·HOLLOW·TILE





FOR the dry kilns of the new Packard factory in Detroit, Packard needed the last word in dry kiln construction for perfectly drying and seasoning the lumber used in their automobile construction. They couldn't put up with the older forms of kiln construction and the difficulty of maintaining the exact temperature and degree of humidity. They couldn't run the risk of fire. So they used Natco Hollow Tile for the walls and special Natco lip tile which makes possible an all-tile ceiling.

Natco is rapid and economical in the construction of dry kilns. It means economy of steam consumption and low maintenance cost. The fact that it is absolutely fireproof means maximum safety where the fire risk is greatest, and its use materially reduces insurance costs.

Natco is ideal for dry kiln construction, as it is for all forms of buildings, from smallest residence to skyscraper — damp-proof, vermin-proof, warmer in winter and cooler in summer, economical, modern, and always safe.

Write us about your building problem. Our literature and our free service cover all types of construction. Let us co-operate with you.

NATIONAL·FIRE·PROOFING·COMPANY
386 Federal Street, Pittsburgh, Pa.

Other Offices:
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PHILADELPHIA WASHINGTON SYRACUSE

23 factories in the United States and also at Hamilton, Ontario, Canada

PACKARD USES NATCO

OFFICIAL JOURNAL OF SOCIETY ADVOCATING FIRE ELIMINATION

CONSTRVCTION

WITH A
DEPARTMENT DEVOTED TO

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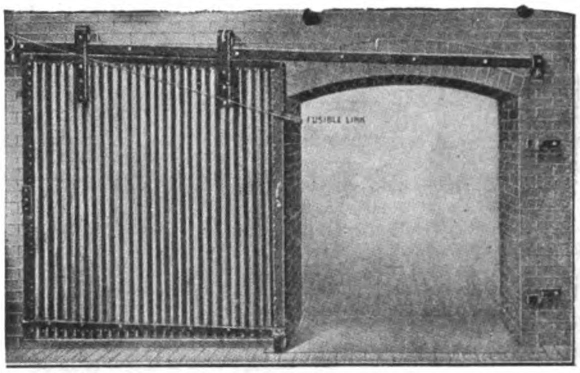
Entered as second-class matter November 3, 1915, at the post office at New York, New York, under the Act of March 3, 1879.

SUBSCRIPTION PRICE—TWO DOLLARS THE YEAR IN U. S. A.

Saino
SHEET METAL
FIRE DOOR

Labeled by Underwriters' Laboratories.



Saino All-Metal
Fire Doors and Shutters

Light, Rigid, Indestructible! Built for daily use. No wood to rot; no tin to rust; no repairs. Seventeen years without a replacement from fire, rust or rot.

SAINO FIRE DOOR AND SHUTTER CO.
BROOKLYN CHICAGO MEMPHIS, TENN.

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

Kno-Burn
TRADE MARK
Expanded Metal Lath

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

North Western Expanded Metal Co.
Manufacturers of all types
of Expanded Metal
958 Old Colony Bldg., Chicago, Ill.

If you are a Manufacturer *of* Firesafe Material or Protective Devices,

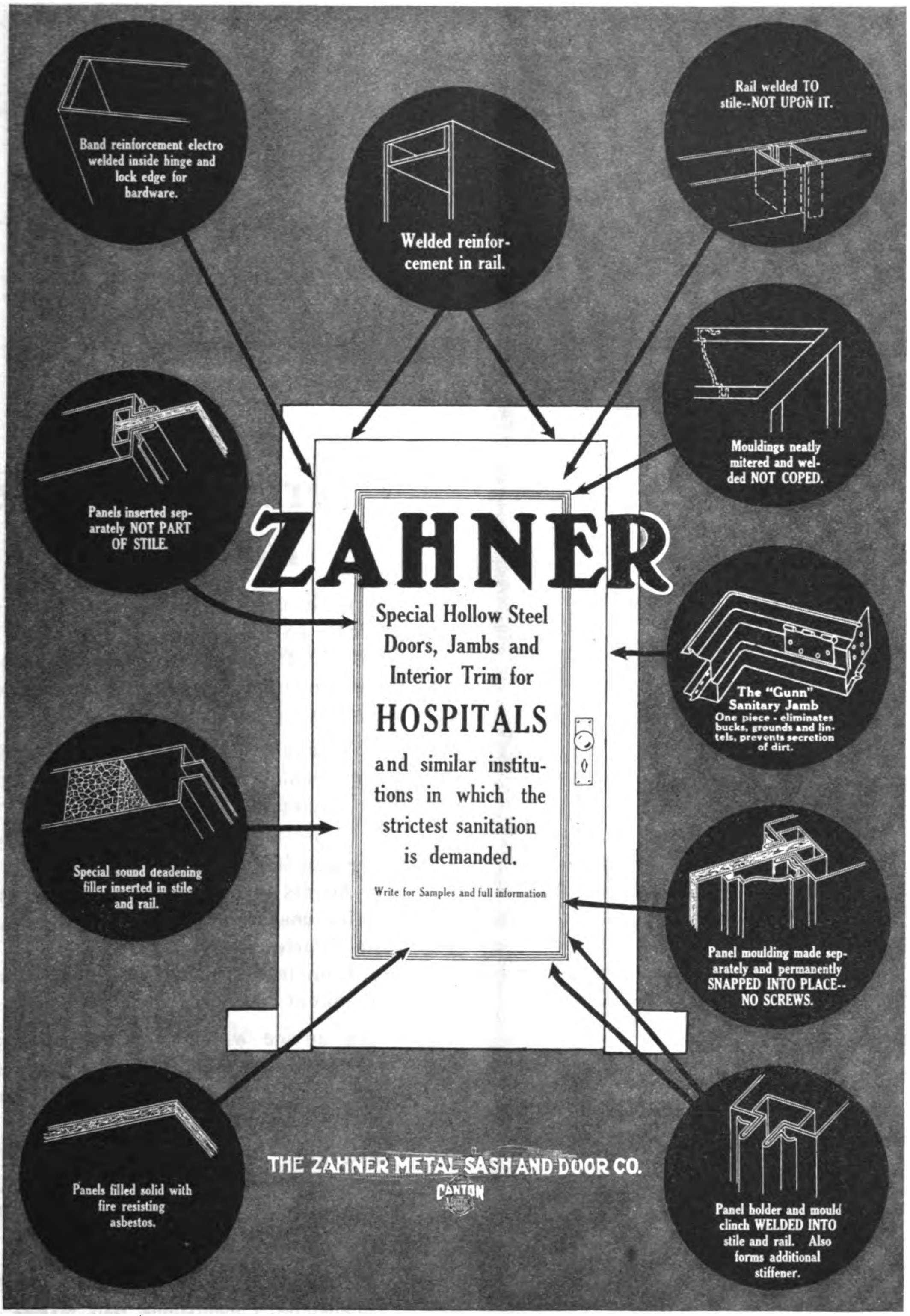
consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advances and proves the argument for proper fireproofing and

(2) what it actually accomplishes to increase the use of firesafe materials and devices.

The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building planning, construction, equipment and maintenance.

The second purpose is accomplished by *actively fighting for legislation favoring firesafe construction* and against laws permitting the continued use of wood——and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that *makers of fireproof materials are now getting but one per cent of the business which ought to be theirs,* that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the co-operation it merits.



Band reinforcement electro welded inside hinge and lock edge for hardware.

Welded reinforcement in rail.

Rail welded TO stile--NOT UPON IT.

Mouldings neatly mitered and welded NOT COPED.

Panels inserted separately NOT PART OF STILE.

ZAHNER

Special Hollow Steel Doors, Jambs and Interior Trim for

HOSPITALS

and similar institutions in which the strictest sanitation is demanded.

Write for Samples and full information

The "Gunn" Sanitary Jamb
One piece - eliminates bucks, grounds and lintels, prevents secretion of dirt.

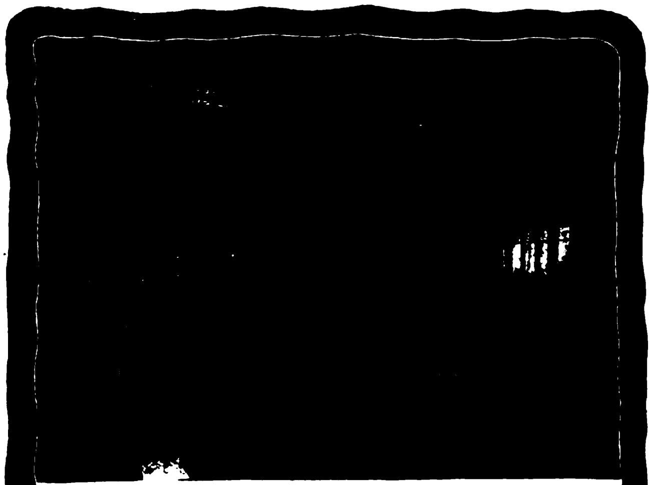
Special sound deadening filler inserted in stile and rail.

Panel moulding made separately and permanently SNAPPED INTO PLACE--NO SCREWS.

Panels filled solid with fire resisting asbestos.

THE ZAHNER METAL SASH AND DOOR CO.
CANTON

Panel holder and mould clinch WELDED INTO stile and rail. Also forms additional stiffener.



Second Floor, St. Francis School, Detroit, Mich. Jos. G. Kastler Co., Detroit, Mich., Architects. Metal Lumber floors and partitions throughout. All partitions non-bearing.

The Lowest Cost Fireproof Construction

COSTS from 4 cents to 10 cents per square foot less than any other system of fireproof construction and only slightly more than wood construction. Why erect your buildings with wood when by using

BERGER'S

Metal Lumber

(PATENTED)

you are assured of a permanent and fireproof construction, at an additional cost of from 3½% to 10%?

This slightly extra first cost is more than offset by the added safety, strength, durability, ease of erection, and lower insurance rates resulting from the use of Berger's Metal Lumber.

It has been successfully used in the construction of 55 types of buildings, ranging in size from the small garage to the large skyscraper, located in 40 different states and 8 foreign countries.

Write for full particulars and copy of New Technical Bulletin L. C.

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Canton, Ohio

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"The Largest Fire Insurance Company in America"

ORGANIZED 1853

THE HOME INSURANCE COMPANY NEW YORK
HOME

ELBRIDGE G. SNOW, President

"Service" in Fire Insurance

Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.

It means a "SERVICE" to Policyholders which is unexcelled. The Company's equipment includes:

1. Experts in every branch at its Head Office and in the Field.
2. Agents throughout the United States and its possessions, and in Canada, to write Policies.
3. Complete facilities for the Prompt Adjustment of Losses.

The advice which may be had gratis from the Department of Improved Risks, located at the Head Office, will be found especially valuable to large insurers.

Ask any "HOME OF NEW YORK" Agent, or address inquiry to Department of Improved Risks, 56 Cedar Street, New York City.

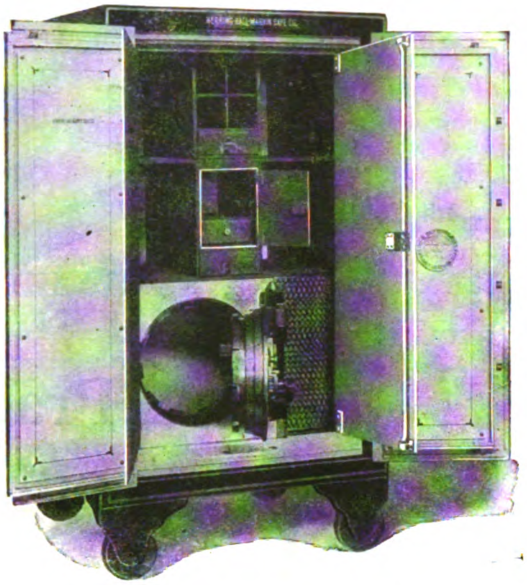
ALL BRANCHES OF FIRE INSURANCE

Automobiles, Commissions, Hail, Marine (Inland and Ocean), Parcel Post, Profits, Registered Mail, Rents, Sprinkler Leakage, Tourists' Baggage, Use and Occupancy, Windstorm.

STRENGTH REPUTATION SERVICE

HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



Fireproof and Burglarproof

SAFES, VAULTS & SAFE DEPOSIT BOXES

For Offices, Residences, Banks and Bankers

We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.

Plans and Specifications furnished without cost

Executive Offices
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Factories
Hamilton, Ohio

Branches
Boston, Mass. ***San Francisco, Cal.*** ***Chicago, Ill.***
Birmingham, Ala. ***New York, N. Y.***

***"Build it of Standard Products
—Make it Consistently Firesafe"***

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August, 1916

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***Are You Boosting For
Fire Prevention Preparedness?***

A Practical Book on Building —Free

THIS Handbook is issued for Architects, Contractors and Engineers, as a reliable every-day reference for permanent concrete construction without the use of form work.

Its tables, drawings, specifications, etc., are complete and down-to-date. The Handbook is re-issued each year and includes the latest developments and most economical practices in fireproof building.

The uses and advantages of Self-Sentering, Trussit and Expanded Metal in all types of buildings are treated fully.

You will want a copy of this new 1916 edition, which is mailed at once without charge. Address

**The General Fireproofing Co.
807 Logan Avenue, Youngstown, O.**

SELF SENTERING

PREPARE AGAINST FIRE

"STAR" VENTILATORS

1,000,000 IN USE

Made in Galvanized Steel or Iron and Sheet Copper.

TYPES—

"Standard" "Fire Retarding"
"Fire Retarding Skylight"

Cuts show Fire Retarding type, with Patent Gravity Damper, in closed position, also a Regulation Base, with a flat disc damper.

MERCHANT'S HIGH GRADE ROOFING PLATES

Tin roofing of the best quality, and properly laid, has acted as a definite fire retardant, not only against damage to interior of building from fire in adjoining buildings, but flames arising from interior fires are very frequently blanketed and kept from spreading by the tin roofing remaining intact.

"MERCHANT'S OLD METHOD"

Brand is the best fire-resisting roofing tin manufactured; Open-Hearth Copper-Bearing base; very heavy coating; Palm Oil process. Send for sample.

On each Sheet

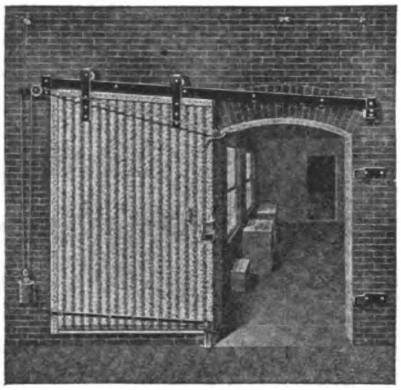
We Stamp the Brand and Thickness

EVANS' "ALMETL" FIRE DOORS

(Patent Pending)

APPROVED by Underwriters' Laboratories.

ACCEPTED Generally by State and City Fire Control Bureaus.



Typical Installation Single Sliding Type

NOTE—

Sectional cut from actual corner of door showing No. 22 Gauge Galvanized Corrugated Cross-Laid Panels—Lined with ⅛" Asbestos. The ½" x $\frac{3}{16}$" Bar Iron Frame and the heavy No. 18 Gauge Galvanized Binder—prevents all damage to edge of Door. *No tin to rust—No Wood to Rot—Very Strong and Durable.* Installed anywhere.

TRADE MARK
M&E Co
REG. IN U.S. PAT. OFF.

MERCHANT & EVANS CO.

SOLE MANUFACTURERS

PHILADELPHIA

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CONSTRVCTION
WITH A DEPARTMENT DEVOTED TO
SAFE HOMES

VOL. III AUGUST, 1916 No. 2

The Fireproofing of the Home

By C. STANLEY TAYLOR

This article, which is the third of a series now appearing in CONSTRVCTION *on the subject of common sense home building, is of an introductory nature. Here the subject of fireproofing the home is considered in a general way, and this article will be followed in the ensuing months by detailed descriptions of such natural divisions of fire-resistive construction and protective equipment as:*

The Proper Roofing of the Home (September)
Exterior Wall, Floor and Partition Construction (using cement in its various forms), October
Exterior Walls "of Brick" (November)
Hollow Tile in the Home (December)
Chemical Extinguishers in the Home (January)
Fire Alarm Systems in the Home (February)
Automatic Sprinklers in the Home (March)
Flue Construction (April)

THE burned homes of America!

* * * *

The horrors of war—shattered homes, desolate, smoking ruins of towns and cities destroyed by modern gun-fire, the bodies of innocent victims—all are brought before our very sight by the wonderful art of the motion picture. We are stricken with horror at the awful destruction and are overcome by the apparent needlessness of it all—but we are powerless to prevent it.

As we read record after record of loss of life and property in the war reports of the daily press we are conscious of a sense of indignation; and with realization of our utter inability to better existing conditions abroad comes determination to help in keeping such conditions out of this country by acting according to our own convictions in a general movement toward the prevention of war.

A great mass of our citizens are working for reasonable preparedness, to so protect our country against invasion that invasion will be impossible.

* * * *

The horrors of fire—flame-gutted homes, desolate smoking ruins of towns and cities destroyed by conflagrations, the bodies of innocent victims—if only *these* could be brought before our very sight in one great panorama of destruction! We would be stricken with horror at the awful destruction and overcome by a realization of the actual needlessness of it all. Here, differing from the existing conditions of war, we *have* the power to prevent the great fire-waste, the burning of 83,000 homes every year, the useless annual loss of five hundred millions of dollars.

We have become too much accustomed to reading record after record of the loss of life and property by fire as set forth day after day in the newspapers. We have accepted the useless fire waste as part of our national existence. Occasionally, as the record depicts a particularly terrible fire, wherein women or little children have been sacrificed to greed and ignorance, we pause, shocked for the moment, and order an "investigation." We blame the careless watchman, the fire department, the owner, the builder, the architect—everyone, in fact, except ourselves, and the dangerous existing conditions of building construction, which we, the people of the United States, allow.

The Indifference of a Nation

After the Iroquois Theatre horror did we create a country-wide demand for *better and safer theatre construction?* We did not! We kept right on allowing our wives and our children to attend theatres which were worse fire-traps than the Iroquois! Other horrible fires have had but an indifferent effect on the class of building construction involved, and that but locally!

Now, after the lessons of Salem and Paris, Augusta and Nashville, and dozens of other great conflagrations in which the spread of flames was due primarily to unsafe dwelling construction, to wood shingle roofs and frame exteriors and to lack of fire protection within the home, we go on our careless and carefree way, building indiscriminately our homes of inflammable material, inviting fire, courting destruction, and only realizing the danger of such a course when we unwillingly contribute our share to the national ash heap!

Must a realization of the ever-existing fire hazard be burned into the mind of every citizen of this country before we exercise common sense and encourage reasonable preparedness against fire in the home?

It is not the purpose of this article to go into details and specific directions in the matter of fire prevention and protection in the home. This subject will be discussed only in a general manner, treating its various natural divisions, which will in turn, however, be taken up in detail in the following issues of CONSTRVCTION, each being given thorough consideration. In general these natural divisions are those of the sub-heads which follow. In view of the fact that over one-half of all burned dwellings are destroyed by fire from without, it will at once be realized that the subject of making the exterior of the home proof against communicated fire is of extreme importance.

This naturally involves the construction of the roof and of the exterior walls.

Roofing the Home

From a purely common-sense standpoint the roofing of the home with any material which is readily inflammable, such as wooden shingles, is entirely without justification and can well be termed the height of folly. Consider the fire reports of any locality in the country and note the number of fires caused by "sparks on roof." Naturally these were not roofs of fire-retardant or fire-resistive material! "Sparks on the roof" are sparks from the chimney of the same house or nearby chimneys, flying embers from nearby fires, or sparks from locomotive, factory or stationary engine stacks.

The subject of fire-safe roofing, which is interesting in that so little is known about it by the public at large, will be considered in detail in the next issue of this publication.

Briefly, shingles which will resist fire are now manufactured and placed on the market at reasonable prices. There are many kinds of these shingles, each having its peculiar virtues. Asbestos and cement, burned clay, copper, steel, galvanized iron, cement, slate and asphalt are all materials which have been put out in the form of shingles. Ready roofings of slate-surfaced asphalt are also obtainable.

In the matter of roofing, the lumber interests have done, and are doing, a great amount of publicity and so-called educational work to discourage the use of unburnable shingles which they are pleased to term "substitutes" for the wood shingle. It is a useless fight! The exercising of good judgment on the part of the American people will in time eliminate the use of the wood shingle in building construction. Roofing with wood is a dangerous practice, decried by every student of fire-prevention, by every reputable insurance interest and by those into whose minds the lesson has already been "burned"!

Exterior Walls

Again, common-sense does not encourage the use of frame exteriors for houses. The frame house is bound to go out by the same door used as an exit by the wood shingle roof. It creates a dangerous condition and no longer carries the strong argument of cheapness as compared to masonry exteriors. The masonry exterior can be used in almost any part of this country at a cost varying from that of wood to 10 per cent above it, and this added cost will be saved by reduced maintenance and insurance charges within five years at the most.

Masonry exteriors also offer a wide variety of choice. Brick is obtainable in the various forms of common brick and face brick in beautiful color tones and patterns. Brick walls may be of common brick surfaced with face brick, hollow tile surfaced with face brick or of frame with brick interior. The use of wood in walls, however, is advised against. Another form of brick construction is that in which each brick forms an entire unit running through the wall, providing hollow spaces for the prevention of dampness and the passage of heat and cold and having the exterior surface in the form of attractively colored face brick.

Hollow tile is used in the construction of exterior walls for the home, usually faced with brick or stucco. At least one form of hollow clay tile has been developed which can be used as self-facing material, the large exposed surfaces forming a pleasing pattern in soft colors.

Cement is used in several ways for the construction of exterior walls. In the form of stucco it is applied on various patented forms of metal lath and metal binders, over hollow tile or brick and is also used for re-surfacing old frame houses. By the use of cement colors and various finishes it lends an attractive appearance to the home. Exterior walls are also built of concrete, sometimes using forms into which the material is poured, sometimes using patented methods of construction in which the forms, usually of metal or wire lath, automatically change into reinforcing as the cement plaster exudes from the mix to be finished in the manner of stucco finishing. Again, machines are obtainable which will mold concrete blocks or brick on the job, such blocks being of special form to provide the necessary hollow spaces when the wall is erected.

In all a wide selection is offered, by which may be obtained exterior walls of beauty, permanence and safety.

In the matter of interior construction, the important points are those concerned in checking the rapid spread of flames. Floors, particularly the first floor over the basement, should be of masonry construction, either concrete or hollow tile, or a similar material which wil serve the purpose of keeping the flames from spreading upward through the house in case of fire in the basement.

Staircase openings should be cut off with walls of masonry; and the partitions, at least the principal partitions, should be of masonry.

Particular attention should be given to the construction of chimneys and flues. Improperly constructed and defective flues form one of the principal causes of fire in the home, the fault lying particularly with the speculative builder, who often "skins" this part of his job as a matter of course.

Fire Protection in the Home

Fire extinguishers

No home is complete without a proper equipment of fire extinguishers. It is right and proper to build in such a manner that the spread of flames is discouraged, but there is no denying the fact that the best fire is a dead fire, and that the rapid extinguishment of the incipient blaze is of particular importance. Many homes have been saved because of having chemical extinguishers on hand, and the instruction of the general public in their use, and the value of keeping such protective devices in the home, is an important means toward the reduction of the number of unnecessary fires. The new dwelling house code of the National Board of Fire Underwriters urges the placing of one or more approved 2½-gallon chemical fire extinguishers, where ready for instant use and not subject to freezing, in every house.

Automatic fire alarms

The value of the installation of reliable automatic fire alarm systems, particularly in large dwellings, can not be over-estimated. At night, and usually during the day time, fire would have an excellent opportunity to get a good start in certain parts of the house which are not ordinarily much in use at the times specified. Alarm systems, which are set off by a rapid rise of temperature and are arranged to not only give the alarm but to locate the blaze, have a distinct and valuable place in the protective equipment of the home.

Automatic sprinklers in the home

The dwelling house code of the National Board of Fire Underwriters comments on this subject as follows:

"The value of the automatic sprinkler as a reliable device to insure a building against loss by fire is being more fully recognized with each succeeding year. It is, without question, the most efficient and certain of all fire extinguishing devices known. Buildings so protected secure the lowest insurance rates, and the saving is often sufficient to make the installation a good financial investment aside from the other advantages derived.

"While the use of the automatic sprinkler has thus far been confined to buildings of business or public character, it is believed the time is fast approaching when it will be generally recognized as a suitable and desirable adjunct to the equipment of large dwellings, at least in those portions where the greatest fire hazard exists.

"The cost and maintenance of such an installation might be prohibitory for moderate-priced dwellings, but, for handsome mansions, involving large values, a sprinkler equipment would be a very prudent investment, particularly in isolated localities, or where public fire protection is weak.

"It is recommended that in such establishments a sprinkler system be installed which will at least protect the cellar, basement, kitchen, laundry, storerooms, and other parts where particular fire hazards are known to exist, such as work rooms, smoking rooms, library, attic, etc. When such a dwelling is subject to exterior exposure hazard from nearby buildings, it is advised that the windows in the side subject to such exposure be protected by outside dry pipe sprinklers.

"A single approved source of water supply would be sufficient for such a system. Where a suitable water supply is not available, there are sprinkler systems designed for such conditions which are supplied by water under pressure from chemical tanks located in the cellar or other convenient place. The cost of a sprinkler system would be a very moderate expense, as compared with sums frequently expended for other purposes on such buildings.

"The fixtures can be so placed as not to interfere with decorations or be otherwise objectionable, and the safety secured by such an equipment would fully justify the expenditure, in fact ought to demand it."

Sensible Application of Fireproofing

Having covered briefly the subject of fireproofing the home, let us consider this matter from the standpoint of its sensible application.

Modern dwelling houses vary in cost upward from about $3,000, and the natural tendency of the man about to build is to get as much as he can for his money, particularly in the matter of exterior attractiveness and interior comfort.

Where the introduction of the factor of safety against fire is believed to be prohibitive because of increased cost, it is but natural that the prospective home owner, being in most cases ignorant of the rapid development of fireproofing materials, which has brought the prices of such materials within the reach of every man, and being unaware of the increase in cost of good lumber within the last few years, should turn to wood as the cheapest material for the interior and roof of his home. But here is where he makes a serious mistake, even laying aside for the moment the question of fire hazard.

Sources of Information

Through the splendid efforts of the Society Advocating Fire Elimination at Cleveland, of which CONSTRVCTION in its Safe Homes Department is the official organ, a careful study of costs of the average man's home has been made. The interesting fact has been developed that any home varying in cost from $3,000 to $15,000 can be produced with masonry exterior and firesafe roofing at a cost exceeding in no case 6 per cent above that of the same house built with exterior of wood and a dangerous wood shingle roof. In many cases the cost is the same as that of wood, and with certain types of exteriors this cost has been reduced.

Nor is this statement without proof, as in every issue of this publication, in the Safe Homes section, will be found plans and costs of firesafe houses which bear out the claims made in that article and prove conclusively that common-sense, safe homes for the people may be obtained without a material increase in cost. Full information on this subject may be had by applying to the New York office of CONSTRVCTION or the Cleveland office of the Society Advocating Fire Elimination, of which Ralph P. Stoddard is the secretary.

The matter of how much shall be done in the way of fireproofing the home is but another application of common sense to the problem of homebuilding. One would hardly expect to use automatic fire alarms and extinguishers in a $3,000 house, but for interior protection in this type of structure chemical extinguishers are within the reach of every home owner or occupant. Therefore it becomes a matter of careful study, selecting simple designs and reasonably priced forms of masonry exteriors and fire-retardant roofing.

A home is not built to last a day, a week or a year, and the element of cost of maintenance should not be overlooked. Exterior walls which are constructed of the products of clay or cement do not carry the recurring charge of painting or repairing where the work is properly done the first time. Walls of masonry and roofs of firesafe materials have been time and again proven to have two or three times the wearing quality of wood, not being subject to rot, splitting or curling.

Almost invariably, too, the insurance charges on houses of this type are greatly reduced.

From the standpoint of sound financing, then, the home of safe materials appeals strongly. It has strength and character, and carries greater appeal when offered for sale, rent, or as collateral for a mortgage loan. In the opinion of loaning institutions, such as savings banks, trust companies and estates, the home of masonry exterior offers better security for the advancing of money than does the frame house. Offer two houses of identically the same design, one of brick or cement products, the other of frame, to a prospective renter or purchaser—offer them to yourself, picturing them in your imagination. Which do you believe would be invariably chosen?

Mistaken Popular Opinion

Popular opinion in this matter of relative costs is based mainly upon an inborn but mistaken sense of the cheapness of wood. It is based upon ignorance of actual conditions in the market of structural materials for the home as that market exists to-day. It is based upon a woful lack of investigation of such conditions on the part of the homebuilding public.

And if the cost *were* more—considerably more—what then?

Is it worth while to have your family and your goods housed in a fire-trap? Is it worth while to be part of a community which at any time may be fire-swept as was Salem or Paris or Nashville—to become, perhaps, homeless and miserable, to see the family in want and privation for the time being because of the great calamity of a conflagration?

Has any citizen of this country the moral right to add to the already high potential fire hazard of communities of wood construction, to raise infinitesimally the burden of the fire tax on every man, woman and child in the country by building in an unsafe manner?

No! Ignorance can no longer be an excuse, because sources of proper information are open. Cost can no longer be an excuse, because the excessive cost of masonry exteriors and firesafe roofing exists only in the imagination!

Then, in this matter of common-sense homebuilding, we appeal not to public spiritedness nor the spirit of reform, but to the innate common sense of every man about to build, to his justifiable selfishness, to the "pocketbook nerve," when we ask:

"Is it not better to build the home safely and substantially of material that cannot burn nor decay—in a manner which will discourage conflagration and help to render the menace of the wood shingle roof, as it applies to each individual home owner, an unknown quantity in his respective community?

The *safe home* is the cheaper in the end, more beautiful and more enduring, and to the man who chooses wisely in his selection of materials for the construction of his home will come that sense of lasting satisfaction and permanent content which is the reward for the exercise of common sense in building the home.

How the Chateau Frontenac at Quebec Was Saved by a Metal Door

Bruce E. Loomis
Insurance Engineer

THE distinct value of properly guarding against the spread of flames in large hotels is being proven again and again. Sometimes this proof takes the form of a large loss of property, and sometimes of lives, due to fire in a hotel building in which precautions to check the spread of the flames had not been taken: again, as in the instance about to be related, proof comes in the form of a fire checked before it had gained sufficient headway to destroy the building.

The outstanding feature of the fire which broke out in the servants' quarters at Chateau Frontenac, Quebec's leading hotel, on the 15th of May last, is the efficacy of the metal fire doors, which kept the flames from spreading to the main building. But for these simple fortifications against fire the flames would certainly have communicated with the main building, despite the excellent water pressure and the well-directed work of Quebec's entire fire department.

It was about 11.39 P. M. when the first alarm was sounded, calling out six stations of the fire brigade, and this was immediately followed by a general alarm summoning the entire brigade, composed of 117 men, on duty at the time, and four sub-chiefs.

The fire, which had broken out in the connecting wing on des Carrieres street, was discovered in the baker's room, where he was sleeping at the time. The blaze worked its way up through the ceiling of the room, communicating with the staff dining room and the attic above, where the winter sash were stored. *On the attic floor the fire spread more rapidly in view of the quantity of dry wood, of which the winter window sash are composed,* and worked both ways, eating its way under the roofing, which was of metal and served to keep the fire in. The entire connecting wing was badly gutted, and the water and smoke damage was almost equal to that caused by the fire itself. Burning their way south on the attic floor, the flames soon reached the main building, but at this point a modest little automatic metal door, about 5 x 3 feet, which communicated with the main building, blocked the way. The metal door triumphed over the fiery element, and rage as they might, the flames were baffled.

On the north side of the connecting wing the door leading from the kitchen to the Empire dining room was dropped; but it was not needed, except to keep out the smoke and water, as the flames had only worked in that direction on the attic floor.

The firemen worked hard, and with eight hydrant streams, two engine streams, 100 pounds of pressure, 4,450 feet of 2½-inch hose and 921 feet of ladders, their efforts were seconded by the Chateau staff, who also had several lengths of the hotel hose in commission.

It was at 6.30 o'clock in the morning of the 16th of May, the day following the outbreak of the fire, before the firemen could be sure the flames were completely extinguished.

The renovation work is now going on rapidly, and Mr. W. S. Downing-Cook, the contractor, has a large staff of workmen continually on the work, which is progressing very favorably.

Chateau Frontenac

Description of Building: The kitchen wing is an irregularly shaped building, constructed of brick and stone, four stories and attic in height, with metal-covered roof; the main entrance to the hotel being through a porte cochère under one end.

The main part of the building is approximately 44 feet in width by 95 feet in length, with a smaller 3-story connecting wing approximately 33 feet wide by 34 feet long. The upper floor, attic and roof are of frame construction, while the other floors are of fireproof construction, and the entire wing is cut off from the main building on each floor by automatic fire doors in fire walls. The basement story, which is at the court yard level, contains the kitchen, store and preparation rooms; the ground floor contains the delivery entrance, steward's office, bakery and pastry departments, butcher shop and storage refrigerators. The first floor contains the kitchen, and the second floor the help's dining rooms; sixteen helps' bed rooms also being located on these two floors.

In the construction, the bed rooms are being confined to the small connecting wing, to which an additional story is being added, and which will be cut off from the main part of the kitchen wing and the main hotel by fire walls with automatic fire doors. *The entire wing will be protected by a sprinkler system.*

Damage: The fire damaged practically the entire roof, which has to be rebuilt, and the interior finish of the second story, all of which had to be removed and replaced.

Water badly damaged the plastering and interior finish throughout the lower stories; destroyed the insulation of all the refrigerators, rendering them worthless; damaged the bake ovens to such an extent as to require their removal and the building of new ones, and did more or less damage to the kitchen equipment.

Within 24 hours the kitchen was cleaned up and put into operation, and although under a handicap, is, with the exception of the bakery, still in operation pending the installation of new equipment. During the time the kitchen was out of commission meals were served from the summer cafe kitchen, with little or no inconvenience to guests.

Editorial comment on the possible horror and loss which might have resulted if this hotel had not been safeguarded against possible fire is unnecessary. The black pages of the fire record hold only too many accounts of the results of fires which have started at night in other great hotels.

The Canadian Pacific Railroad Company, owner of the Chateau Frontenac, is to be congratulated on the wise foresight which led it to employ competent insurance engineers to outline and install proper protection against the hazard of spreading flames.

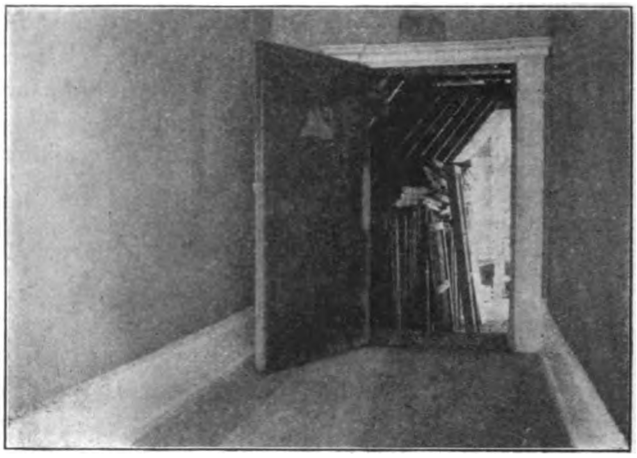
The particular points of interest in this fire are:

1. The service of the metal fire door.
2. The spread of flames due to wood in the construction of the building.
3. The blanketing effect of the metal roof.
4. The intended installation of a sprinkler system in the Chateau Frontenac.

The automatic metal fire doors acted immediately when the fusible link was melted by the heat. In this manner the flames were checked at the entrance to the larger building and at the same time draft was cut off appreciably. With the able assistance of these doors—one door in particular (that shown in the accompanying photograph)—the active fire department was able to put out the flames.

The matter of the spread of flames due to wood in the construction of the building brings up a very interesting subject—that of the protection of existing unsafe buildings against the spread of flames. This building, which had been constructed a number of years before, was not fireproof. The question then was to safeguard it in such manner that the flames could not travel rapidly throughout the building to result in its quick destruction. How this was done is explained briefly by Bruce E. Loomis, Chief Engineer of Marsh & McClennan, 80 Maiden Lane, New York City, who designed and supervised the installation of the metal doors and other fire protective mediums emloyed in this hotel.

The problem of rendering the Chateau Frontenac safe against the rapid spread of flames was made comparatively simple by the existence of many well-constructed masonry walls in the building. In order to divide the building into smaller areas—to make it practically a number of smaller buildings grouped together—the opening through these walls were made safe against the passage of flame and smoke by the installation of hollow metal and automatic rolling steel doors.



Here is shown the metal fire door which checked the passage of the flames and saved the Chateau Frontenac

It is of hollow metal construction and specially designed by Bruce E. Loomis. The automatic feature involves the use of a fusible link and sliding weight to close the door by the force of gravity.

The existing walls did not extend above the roof, and in order to check the passage of flames over them, they were capped with four-foot slabs of concrete on which the sheet metal roofing was fastened.

In this manner the walls were guarded against the passage of flames through or over, and with the blanketing effect of the roofing, served to confine the flames to that section of the building in which the fire started.

The Editor's Page

IN the busy hours of every day
We pause—
To analyze and weigh
A striking word, or deed, or
thought.

AN editorial in the July, 1916, Quarterly of the N. F. P. A. directs attention to the fearless campaign on the part of an individual, having as its object the lessening of the potential fire hazard in one of the unprotected structures in Philadelphia. The individual—Powell Evans; the building—Gimbel Brothers' department store. The Quarterly makes comment as follows:

The Value of Individual Efforts in Preventing Fire Losses

> "This was Mr. Evans' fight. He originated it; he waged it; he financed it. First he urged the Gimbels to act, for their own good and that of the common safety; then he urged the merchants on every side of the big store (who were paying insurance superpremiums because of it and in danger of conflagration) to move in their own defense. Many feared their big rival and preferred to remain supine. Mr. Evans then appealed to the Philadelphia newspapers; but the Gimbels advertise in the Philadelphia newspapers. What was the safety of the city compared to the Gimbels' monthly check? Mr. Evans then, as chairman of the Insurance Committee of the Chamber of Commerce, took up the fight openly on the floor of the Chamber. Against every influence, open and hidden, he turned his guns, and finally overcame the local official inertia and induced the authorities of Philadelphia to bring suit on behalf of the city, by appointing a leading Philadelphia lawyer special assistant city solicitor, secured by Mr. Evans himself. Then came the organization of the Bryn Mawr Fire Prevention Study, and Mr. Evans interested that fearless band of highly educated, competent women in his fight. On May 11th the whole matter was presented to the N. F. P. A. by Miss Leila Houghteling, of Bryn Mawr (see *Proceedings* annual meeting)), and on June 5th the Gimbels capitulated. At a conference on that day two of the Gimbels, their builder, their insurance agent and their attorney met Mr. Alexander Simpson, Jr., Special Assistant City Solicitor of Philadelphia; Mr. Forster, another assistant; Mr. William A. Schnader, Special Counsel for the Bryn Mawr Committee; Mr. Evans, Chairman of the Insurance Committee of the Chamber of Commerce; Mr. Clark, Chief of the City Bureau of Building Inspection; Mr. Elliot, City Fire Marshal, and Mr. Hexamer, of the Philadelphia Board of Fire Underwriters, and gave in and abandoned their position, agreeing, rather than defend the city suit, to make the substantial corrections called for.
>
> "The firm agrees to erect two fire walls, running north and south, the full length of the building, dividing it into three sections, with automatic fire doors. Under the agreement the defendants will erect at the openings in the "L" portion of their building iron shutters. The minor details of all this work will be adjusted by the Bureau of Building Inspection and the engineer of Gimbel Brothers.
>
> "The cost of the two fire walls and the other work will entail large but reasonable expenditure, considering the results secured to all concerned. The work is to be started not later than July of this year.
>
> "Mr. Evans, after months of intense personal effort and an incredible expenditure of day and night hours, may now for a time turn to occupations more profitable to himself. No one can know the real value of his untiring public service or how great the disaster he may have averted from his city by laying his resources and fine talents upon the altar of the common need. His city will naturally promptly forget his service, but a few choice spirits will remember; the few who look upon courageous, disinterested action as the finest thing in life."

The Department Store Hazard

Some time, and probably within the near future, a horrible loss of life by fire and panic will occur in a department store. The average department store, at certain times of the day, is crowded with women and children. The large areas and usually poor exit facilities of this class of buildings are conducive to a rapid spread of fire and smoke, to panic, and the resultant loss of life.

Taking the United States as a whole, about one-half of the department stores are unprotected against fire except in the most superficial manner. From the insurance standpoint, department store risks are divided generally into classes and rated according to the hazard. The unprotected buildings carry an average contents rate of 60 cents, which in the opinion of experienced underwriters is fully 100 per cent too low, while the following comparison will show the saving effected by the housing of the business in a properly designed and protected fireproof building:

Fireprof department store in Albany, N. Y. Building rate................	.14
Unprotected department store in Albany, N. Y. Building rate..............	.44

The rate on contents varies in the same proportion when such contents are properly safeguarded.

The introduction of automatic sprinklers, chemical extinguishers, and proper automatic alarm systems, together with the cutting up of dangerous areas by the use of fire-walls, the protection of vertical openings and openings in exterior walls by the use of metal fire doors, metal window frames and sash, wire glass and metal fire shutters, is but a matter of common-sense protection which should make a direct appeal from the standpoint of reduced insurance and maintenance costs without considering the matter of public safety.

Many Department Stores Unprotected

That so many of this class of buildings are not protected would seem to be due to a lack of knowledge on the part of owners as to the benefits accruing from proper protection against fire. That public safety is not given consideration has been shown by many "investigations" to be simply a matter of putting dollars before lives. Here, then, is where individual effort may be used to correct both wrongful conditions. First, by seeking to show the owner the advantage of taking his building out of the "unprotected" class; and, if this does not suffice, bringing pressure to bear which will force him to do so for the sake of public safety.

Mr. Evans has pointed out and proven the feasibility of a course which might be followed with advantage by other strong-minded individuals throughout the country. The public, as we know the public, will not act in this matter of department store fire and panic hazard. There is no such thing as concerted public action in the United States. Eventually, a realization of the utter folly of allowing the existence of conditions which are responsible for the great fire waste will create a strong undercurrent of public feeling against such conditions, and they will be eliminated by individuals upon whose shoulders has been placed the responsibility of guarding public safety in the matter of building construction and occupancy. But why wait for the slow growth of public feeling?

Every individual who is interested, officially or otherwise, in proper fire-safe building construction and the elimination of fire-traps, should be encouraged by the success of Mr. Evans' activities in the matter of the Gimbel store to take individual action against dangerous conditions of the existence of which he is aware. There has been too much procrastination, too much politics, and too much of the spirit of "dodging the issue" on the part of individuals who are in a position to take action in this matter, and the widespread beneficial effect of such action as they have the power to take in the matter of urging and forcing a reduction of individual fire hazards should in itself be a sufficient reward to those who earnestly strive to do their whole duty. Individual effort to correct improper conditions has often proven its own reward in many ways.

The Augusta Conflagration Should Have Been Stopped Where it Started

THE fire which destroyed 682 buildings, with an estimated value of five millions of dollars, in Augusta, Georgia, on March 22d, started in the first office building built in the city. We presume that any sprinkler salesman who had approached the owners of this building with a proposition to make it safe from fire by an installation of automatic sprinklers would have been laughed at for his pains. He would have been told that the system would not pay for itself quickly enough in insurance savings, and yet failure to equip this old building has brought an enormous loss and large suffering to Augusta.

It is not fair to say that the owners of the Dyer Building had any realization of the potential tragedy which was housed in their building. But Fire Chief Reynolds knew the danger. According to the *Augusta Chronicle* the Chief said: "In the first place the fire was bound to have been a big one, owing to the nature of the Dyer Building." This Southern paper also says that the Fire Chief has several times gone on record as saying that if ever a fire gained any headway in this building there would be no hope of saving it.

There is probably no city of size in the country which has not several Dyer Buildings. They are mostly in congested value districts, and when once they get on fire there is a menace created which nullifies to a large degree the superior structural nature of the more modern buildings which surround them. Within the fire limits of most cities a certain minimum standard of construction is now being demanded. The question, therefore, arises as to whether it is logical to require new construction to be of a certain type and yet allow conflagration breeders to go unequipped with the only practical apparatus that will make them as safe—yes, safer—than the new structures that are going up about them.

Most mentions we have seen of the Southern conflagrations of the past four months say in substance that the only cure for such disasters is the adoption of proper building practices. No one seeks to minimize the value of fireproof construction, but the practical gutting of the Chronicle Building in Augusta and many other modern structures there shows, beyond a doubt, that building construction in and of itself is not the answer to this great American question.

Every city has hundreds and hundreds of dangerous buildings already standing. What are the fireproof construction advocates going to do about these buildings? We cannot tear down what we have already built. The erection of a few fireproof buildings here and there as older buildings burn, is no cure at all; because it has, as we think, been pretty well established that a hot blast conflagration is not seriously deterred by now and then running up against a fireproof building. And, moreover, the word "fireproof" is a very relative term, because it does not take into account the tons and tons of inflammable contents that are contained within fireproof buildings.

We are facing a condition of burnable buildings, but we are also facing a far greater thing in burnable contents. We believe that it is more important to safeguard existing buildings and practically fireproof their contents than it is to put our trust in replacing burned buildings with non-burnable buildings full of burnable contents. Every fire protection engineer knows the best way to make the contents of a building unburnable, and *it is not by putting those contents in a stove.—Grinnell Automatic Sprinkler Bulletin.*

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Brick and Tile Products

The value of the brick and tile products of the United States in 1915, according to the United States Geological Survey, Department of the Interior, was $125,794,844. Three varieties of brick and tile and miscellaneous products increased in value in 1915 compared with 1914. Front brick, valued at $9,535,536, increased $245,913, or nearly 3 per cent over 1914; draintile, valued at $8,879,264, increased $357,225, or 4 per cent; fire brick, valued at $18,839,931, increased $2,412,384, or nearly 15 per cent; and miscellaneous products, valued at $3,716,944, increased $551,130, or 17 per cent. There was a decrease of the total product of about 3 per cent.

The product that showed the greatest decline was sewer pipe. Common brick and terra cotta also showed decrease compared with 1914. The decrease in these industries occurred during the early months of the year, but the conditions improved and the year closed with bright prospects for 1916.

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"If you have to paint a wooden shingle to make it fireproof, why not add the price of the paint to the shingle in the first place and put on something that will not burn?" asks the Marshal of South Dakota.

There must be built up against flimsy construction a solid wall of public sentiment. You must carry the message home to the people and teach them the value of building materials which cannot burn.

Comparative Fire Losses.

	Number of Cities Reporting Loss					Population					Per Capita Loss				
	1911	1912	1913	1914	1915	1911	1912	1913	1914	1915	1911	1912	1913	1914	1915
United States......	298	300	298	298	333	31,210,084	32,326,633	33,281,804	40,213,230	35,161,266	2.62	2.55	2.25	2.32	1.94
Argentina		1	1				1,428,042	1,428,042				3.58	4.21		
Austria......... .	1	4	4	1		2,031,498	2,658,078	2,734,936	157,000		.08	.30	.25	.42	
Belgium		1	1				166,445	168,812				.69	1.36		
Canada	1	5	6	6	3	125,000	957,372	612,453	597,709	249,344	2.61	2.88	2.46	3.58	2.79
Chile.............			1		1			200,000		220,000			.30		.58
England	12	12	14	9	8	9,898,317	7,164,849	7,396,664	6,916,651	6,442,239	.53	.54	.33	.67	1.03
France............	3	6	5	3	3	3,518,493	4,425,696	3,945,743	3,659,224	3,957,729	.81	.84	.49	.63	1.02
Germany	8	9	8	4	2	2,306,354	2,659,575	2,559,608	836,007	423,673	.21	.20	.28	.17	.49
Hawaii			1					45,000					.69		
Ireland...........	2	2	2	2	2	694,272	699,808	701,400	700,000	701,500	.58	.57	.28	.39	.55
Italy.............	6	3	5	5	3	1,373,995	282,082	1,161,465	1,189,458	1,078,691	.31	.90	.25	.37	.62
Japan			3	10				2,481,528	5,611,983				.59	.44	
Norway...........		1	1	1			250,000	250,400	251,000	253,000		.69	.32	.48	.72
Philippine Islands .			1	1	1			234,409	234,409	234,409			4.41	1.28	1.00
Russia	2	2	2	1	1	3,483,291	3,485,583	3,710,000	1,617,157	2,000,000	1.17	.84	.89	1.19	.95
Scotland	2	2	3	1	3	484,190	485,091	1,516,905	163,891	1,534,591	.56	.49	.36	5.35	1.62
South Africa......				1					50,000					1.77	
Spain			1	1	1			605,870	606,150	608,700			2.30	.15	3.13
Sweden...........		1	1	1			351,500	383,000	386,211	392,427		.13	.74	.54	.29
Switzerland		1	1	1			140,000	142,000	145,000			.04	.15	.19	
The Netherlands ..		2	1	1	1		417,693	301,846	312,424	321,853		.12	.11	.07	.14

	Population	Total Loss	Per Capita
1911 — Whole country	93,927,000	*217,004,575	2.31
298 cities	31,210,084	† 81,790,877	2.62
1912 — Whole country	95,410,503	*206,438,900	2.16
300 cities	32,326,633	† 82,297,386	2.55
1913 — Whole country	97,163,330	*203,763,550	2.10
298 cities	33,281,804	† 74,876,608	2.25
1914 — Whole country	98,781,324	*221,439,350	2.24
298 cities	40,213,230	† 93,368,795	2.32
1915 — Whole country	100,399,318	*172,033,200	1.71
333 cities	35,161,266	† 68,386,218	1.94

*Estimated. †Actual figures reported.

*ANNUAL FIRE LOSSES IN THE UNITED STATES FOR FORTY-ONE YEARS — 1875-1915 INCLUSIVE.

YEAR	AGGREGATE PROPERTY LOSS	YEAR	AGGREGATE PROPERTY LOSS	YEAR	AGGREGATE PROPERTY LOSS
1875	$78,102,285	1889	123,046,833	1903	145,302,155
1876	64,630,600	1890	108,993,792	1904	229,198,050
1877	68,265,800	1891	143,764,967	1905	165,221,650
1878	64,315,900	1892	151,516,098	1906	518,611,800
1879	77,703,700	1893	167,544,370	1907	215,084,709
1880	74,643,400	1894	140,006,484	1908	217,885,850
1881	81,280,900	1895	142,110,233	1909	188,705,150
1882	84,505,024	1896	118,737,420	1910	214,003,300
1883	100,149,228	1897	116,354,575	1911	217,004,575
1884	110,008,611	1898	130,593,905	1912	206,438,900
1885	102,818,796	1899	153,597,830	1913	203,763,550
1886	104,924,750	1900	160,929,805	1914	221,439,350
1887	120,283,055	1901	165,817,810	1915	172,033,200
1888	110,885,665	1902	161,078,040		

*These figures are obtained from the Records of the Journal of Commerce, deducting the Canadian losses.

CITIES IN WHICH LOSS EXCEEDED $5.00 PER CAPITA.

1915

Newport News, Va.............	$28.00
Clinton, Ia....................	12.46
Augusta, Ga...................	11.87
Raleigh, N. C.................	10.37
Key West, Fla................	9.41
Lockport, N. Y.	9.31
Muncie, Ind....................	9.16
Davenport, Ia.	8.80
*Trenton, N. J................	8.11
Erie, Pa.......................	7.78
‡Shreveport, La..............	7.64
Wilkinsburg, Pa.	7.50
*Montgomery, Ala.	6.94
Danville, Ill..................	$6.86
Joliet, Ill.....................	6.83
*Galveston, Tex................	6.52
Springfield, Ill................	6.47
‡Fresno, Cal.	6.24
‡Port Huron, Mich.............	6.06
†Salem, Mass..................	5.85
Muskegon, Mich...............	5.57
Williamsport, Pa.	5.48
†Dubuque, Ia.	5.35
Burlington, Ia.................	5.14
Oswego, N. Y.	5.14

Comparative Statistics of Fire Losses

From N. F. P. A. Quarterly, July, 1916

(*Note tables on opposite page*)

THE Committee on Statistics and Origin of Fires of the National Board of Fire Underwriters has recently submitted its annual report on fire losses for the year 1915. A summary of this report is presented herewith in the thought that our members will find the data of special interest and also of assistance in advocating improvements in their local city or town.

Referring to the statistics for the year 1915 the committee says:

It is becoming more generally realized that America's extraordinary fire losses, as compared with those of other countries, constitute a serious drain upon our national resources. Exact data as to the extent of this wastage are, therefore, of importance in all estimates of the country's prosperity. The development of fire fighting and fire prevention methods can best be appraised in the light of their results, and these broad statistical summaries give the truest indication of success or failure. The chiefs of the various fire departments, who, by their prompt and careful returns, make possible for us to assemble this information, are rendering an important public service.

If the basis used by the United States Census Bureau in estimating the population of communities is correct, there are in this country three hundred and forty-one cities whose population is twenty thousand and upwards in comparison with about two hundred and fifty ten years ago; an increase worthy of note from a statistical viewpoint. We have secured reports from three hundred and thirty-six cities, the largest in point of number since this work was inaugurated, and in a great majority all the inquiries on our blank form have been answered; this no doubt being due to the adoption by upward of two hundred and seventy-five cities of our Fire Record Book. It is evident that the representatives of our members are co-operating in better manner than formerly with the fire chief by furnishing him the amount of loss, but there yet remain a few exceptions—and for no apparent reason. The amount of a loss by fire is no longer, and, in fact, never should have been, considered a "State secret," and every agent ought to be willing to co-operate with the fire department in this small matter.

A study of the record of 1915 in comparison with its recent predecessors encourages the hope that in some places the fire prevention efforts have produced good results, and the progressive cities in such matters are to be commended. The chief of fire department who has established a fire prevention bureau as an adjunct of the fire department and details experienced firemen to inspect premises for hazardous conditions is responsible for much of the lessened fire loss in many cities. Men trained as fire-fighters are not only competent, but they have learned in their work to recognize the possibilities of hazardous conditions, and given authority to order the removal of all evident fire hazards, and demand the exercise of greater care in and about premises, will do much to prevent fires and lessen the loss of life and property. The city official—Mayor or chief of fire department—that has not organized a fire prevention bureau, examining the statistical data presented with this report, will be impressed with the accomplishments in neighboring places. It not only makes the fire department an agent for the prevention of fires but, through the knowledge obtained by the inspection of buildings, the firemen have an acquaintance with the construction and equipment of premises which will stand them in good stead in the event of a fire.

The losses in European cities continue to be much less per capita than for the United States and Canada. However, it was most encouraging to see the figure for the United States per capita loss drop to $1.71, as compared with an average of over $2.00 for the last few years. Members residing in those cities showing a per capita loss in excess of $5.00 should make every effort to enlist the various public spirited organizations of the city in a campaign of improvement. There is always a remedy for the causes producing such a result and a sufficient effort will find that remedy.

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Secretary Wentworth, of the National Fire Protection Association, addressed the annual convention of the National Lumber Manufacturers Association in Chicago on June 1, and the annual convention of the National Wholesale Grocers Association in Boston on June 15, presenting at both the N. F. P. A. resolutions, declaring for the fixing of the cost for extinguishing fires upon those disobeying or ignoring fire prevention orders. The resolution was unanimously adopted by the grocers, but the lumber manufacturers took no action.

At the annual meeting of the New York Chapter of the National Fire Prevention Association, President Miller and Secretary-Treasurer Hardy were re-elected for the current year; the executive committee being John Kenlon, Dana Pierce, Howard Chapman, L. I. Neale, D. E. Waid and John C. Eames.

Munitions Explosion Shakes New York

PERSONS residing in New York City and within a radius of fifty miles thereof were severely frightened early on the morning of July 30 by a series of heavy explosions of dynamite and general war munitions stored in warehouses on Black Tom Island, in the harbor.

Only two lives were lost, but had the explosion taken place twelve hours earlier or later, when traffic was at its height, the casualties unquestionably would have mounted into the hundreds, if not thousands, for in all sections of the metropolis below Forty-fifth street, heavy plate glass fronts were blown out and fell crashing upon the sidewalks. Very fortunately the disaster occurred at a time when the streets were practically deserted; and to this fact alone can the limited loss of life be attributed.

The property damage is as yet unknown. It has been variously estimated at from $10,000,000 to $30,000,000; some time must yet elapse before authoritative figures can be given.

Investigations by Federal, State and municipal authorities have signally failed to find the primary cause of the explosions or to fix the responsibility. There are regulations in plenty governing the manufacture, handling and storage of explosives; yet, in spite of all lesislation, the greatest explosion of its kind in all history took place within three miles of New York City.

The fire and the marine insurance companies have large amounts at risk upon the destroyed property. Before making payments they will endeavor to have the liability for the explosion placed where it properly belongs, and, when this is done, settlement will doubtless be made with the assured, and subrogation taken. Endless litigation is bound to ensue; those suffering loss being determined to collect damages if it be within the realm of possibility.

Construction of Storage Warehouses

The National Storage Company's warehouses on Black Tom Island were fairly well protected, according to standards existing at the time of their construction, although not constructed to be proof against dynamite explosions and shrapnel. The property was occupied for the storage of non-hazardous freight, several of the sections being used as bonded warehouses. The principal storage was sugar, flour, glassware in cases, tobacco, baled burlap, etc., but no munitions or other hazardous property.

The brick warehouse buildings, seventeen in number, were from five to six stories in height, divided into three groups, 100 feet space between groups. The construction was heavy joist. The stairs and elevators were protected by twelve-inch metal curtain boards and wood traps, mainly non-automatic. The division walls were blank, from sixteen to forty-four inches thick, with three and four-foot parapets. Iron shutters protected all outside openings. There were also three frame one-story covered piers. The large frame pier No. 4 was cut off from the brick warehouse "A" by solid blank wall. Piers Nos. 5 and 6 were located approximately 40 feet from the warehouses.

All of the above described buildings were protected with a standard Esty dry pipe sprinkler system, supplied by twelve-inch city main, furnishing thirty-six pound pressure, and a 50,000-gallon gravity tank at an elevation of thirty-two feet above the top line of sprinklers in the five-story warehouses, and a second steel tank of 50,000 gallons capacity, elevated twenty feet above top line of sprinklers in the six-story warehouses, and a third gravity tank of 100,000 gallons capacity, bottom on level with highest sprinklers.

The pump supply consisted of a 1,500-gallon per minute Underwriter pump, and electric power centrifugal pump, rated capacity 1,500 gallons per minute. There was also a 750-gallon steam service pump that could be used as an auxiliary supply. The entire equipment above described was installed in 1914.

There was American District Telegraph Company supervisory service. The alarm service consisted of water rotary gongs connected to dry valves, with four watchmen reporting rounds hourly on boxes located on the outside of the buildings nights and Sundays.

The buildings were well divided into several sections and protected by a modern sprinkler system. Under any other condition, it is believed that a fire could not have spread quickly beyond the section in which it originated, but the ignition of the large amount of explosives nearby dismantled the fire protection, wrecked the buildings and exposed the property to destruction by fire which immediately followed. The companies making a specialty of sprinklered and protected risks took large lines in the warehouses.

John J. Carlin is to erect on a lot on Pimlico Circle, Baltimore, a four-story apartment house, to cost about $75,000. Plans for the structure are being drawn by Architect Stanislaus Russell, of the Monumental City.

Plans for remodeling the Newark Theatre, Newark, N. J., into a photoplay house call for the expenditure of nearly $115,000. Architect Thomas W. Lamb designed the improvements.

Dickman & Thompson, builders, of Cincinnati, Ohio, will spend $250,000 in erecting structures upon a seven-acre section in the northern part of the city, which they recently acquired.

The Fire-Resisting Qualities of Metal Ceilings

From the report of a fire test to determine the comparative fire-resisting qualities of metal ceilings and plaster ceilings made at Columbia University Fire Testing Station, Greenpoint, Brooklyn, on November 11, 1914, by James S. McGregor, M. S.

WHILE it is generally recognized that metal ceilings offer better protection against fire than the ordinary plaster ceiling, it was not until 1914 that this fact was shown exclusively by an official fire test.*

PURPOSE OF TEST

The purpose of the test described herewith was to determine the relative fire-resisting merits of six different types of ceiling construction.

METHOD OF CONSTRUCTION

The ceilings were constructed in a test chamber designed for the conduct of fire and water tests upon fireproof floor constructions. This chamber is made of reinforced cinder concrete, has 14 feet x 20 feet inside sectional dimensions, and is provided with suitable draft and flue openings.

The lower faces of the ceiling constructions were 9 feet 6 inches above the grate level. The particular construction installed in each panel is described briefly in the following paragraphs. That relative results might be obtained the panels or bays were insulated from each other by an effective fire-stop, consisting of traverse girders of reinforced concrete. These were covered on top by a 2-inch slab of reinforced cinder concrete.

DESCRIPTION OF TYPES OF CEILINGS TESTED

The following are construction details for each panel:

Panel No. 1.—Constructed of 3-inch x 8-inch spruce beams spaced 16 inches on centers to which was applied No. 25 U. S. gauge painted expanded metal covered with ¾ inch of lime plaster, made up of a scratch, browning and finish coat.. The scratch coat was a 1 to 3 slaked lime sand mix to which hair was added; the browning was the same as the scratch with less hair added, and the finish, plaster of paris and limoid in regular mix.

Panel No. 2.—Constructed of 3-inch x 8-inch spruce beams spaced 16 inches on centers to which ½-inch plaster boards were attached. ⅞-inch x 1½-inch wood furring strips spaced 12 inches on centers were applied to this surface. The whole covered with No. 29 U. S. Standard gauge stamped steel sheets, and finished about the edges with 3-inch x 3-inch stamped metal cornice.

Panel No. 3.—Constructed of 3-inch x 8-inch spruce beams spaced on 16-inch centers to which ⅞-inch x 1½-inch spruce furring spaced 12 inches on centers was applied. The whole covered with No. 29 U. S. Standard gauge stamped steel sheets, and the edges finished with a 3-inch x 3-inch stamped metal cornice.

Panel No. 4.—Constructed of 3-inch x 8-inch spruce beams spaced on 16-inch centers to which was applied ordinary wood lath covered with a lime plaster similar in every respect to that used for Panel No. 1.

Panel No. 5.—Constructed of 3-inch x 8-inch spruce beams spaced 16 inches on centers to which was applied ⅞-inch x 1½-inch spruce furring strips covered with No. 29 U. S. Standard gauge metal. The whole then covered with No. 29. U. S. Standard stamped ceiling, and the edges finished with a 3-inch x 3-inch ornamental metal cornice.

Panel No. 6.—Constructed of 3-inch x 8-inch spruce beams spaced on 16-inch centers and covered first with ⅞-inch tongued and grooved boards, then with No. 29 U. S. Standard gauge stamped metal ceiling, and the edges finished with 3-inch x 3-inch ornamental cornice.

The metal sheets were 24 inches x 48 inches and 24 inches x 96 inches in size, and all cornice was put up in 4-foot sections with a furring strip behind each joint in the "metal field plate."

All metal used had a priming coat of paint applied to each side before being put in place.

General.—Both metal and plaster ceilings were constructed in accordance with standard practice. All plaster was mixed and applied in the presence of an official of the Building Department of the City of New York, by a union mechanic.

RESULTS OF TEST

Observations made upon each panel as the test progressed, together with conditions disclosed by examination subsequent to the test, follow. The elapsed time from the start of the test to that when the observation was made is given in each case:

Panel No. 1.—Plaster ceiling on metal lath:

After 20 *minutes* one-third of the plaster fell, exposing the metal lath. The affected area was in the middle portion of the panel. About 12 per cent of the wood of the beams was charred.

Panel No. 2.—Metal ceiling on plaster board:

After 50 *minutes* wood beams were burning. The plaster board was calcined and about 5 per cent of the wood of the beams were charred.

Panel No. 3.—Metal ceiling on wood furring:

***Report Obtained Through the Courtesy of the Brooklyn Metal Ceiling Co. Brooklyn, N. Y.**

After 15 minutes flames were issuing from joints of the metal.

After 20 minutes the metal sheets were curling away from beams.

After 45 minutes flames were issuing from metal joints.

It was evident that the beams were burning freely.

The metal was still up at the end of the fire test but fell when struck by a light stream of water, the water being applied to cool down the structure in order that it might be inspected by those present. Here the beams remained in place, although it was noted that they were almost entirely charred near the middle.

Panel No. 4.—Plaster ceiling on wood lath:

Several explosions were heard in the test chamber *about 4 minutes* after the fire was started. It is assumed from the general condition of this panel at the twelve-minute period, when the firing doors were opened, that a goodly portion of the plaster was blown off when these explosions took place.

After 12 minutes the ceiling was burned through, the lath and plaster was falling.

After 20 minutes the lath and plaster was practically all down and the beams were burning rapidly.

In this case the beams were almost entirely burned away.

Panel No. 5.—During the early stages of the test, conditions were such in the chamber that it was impossible to note just what was taking place in this panel. The same observation holds in reference to Panel No. 6.

After 50 minutes no flame was to be seen issuing from the joints of the metal.

After 70 minutes flames were coming from the joints and the metal was bulging slightly.

The condition of the beams of this panel, after clearing away the metal, showed approximately 51 per cent of the wood of the beams was charred.

Panel No. 6:

After 35 minutes metal was curling.

After 40 minutes metal was badly bulged.

After 70 minutes flames were issuing from joints of metal.

The wood sheathing was entirely charred and about 24 per cent of the wood of the beams was charred.

CONCLUSIONS

In drawing conclusions based upon the results of this test it must be remembered that the area of Panels No. 1, 2, 3 and 6 was much less than that of Panels No. 3 and 4. Direct comparison, therefore, should not be made between these two sets of panels, although direct comparison is justifiable between panels of each set.

The percentage of charred area of the beams of Panels 1, 2, 5 and 6, together with general observations during the test, would seem to justify the following rating:

First: Panel No. 2.
Second: Panel No. 1.
Third: Panel No. 6.
Fourth: Panel No. 5.

The relative condition of Panels No. 3 and 4 justifies rating.

First: Panel No. 3 (Metal Ceiling).
Second: Panel No. 4 (Plaster Ceiling).

The interesting facts developed in this test indicate that metal ceilings have distinct fire-retardant value, and may well be used to lessen the danger of flames communicating through floors because of the lack of proper fire-stopping. It is, of course, obvious that the ordinary ceiling of plaster on wood lath presents no obstacle to the passage of flame.

$1,000,000 Contract for Stone and Marble in Hotel Commonwealth

ONE million dollars' worth of Carthage stone and polished marble is to be supplied by the Lautz-McNerney Stone Company of Carthage, Mo., for use in the $15,000,000 Hotel Commonwealth. This order for material is one of the biggest of its kind ever given. The Commonwealth, which is to be erected in the Times Square district of New York, will be the largest hotel in the world and Manhattan's greatest midtown landmark.

The polished marble, which the Lautz-McNerney Company is to deliver, will be used for interior finish and tiling. The Carthage stone will be used for the exterior of the lower stories and for the trimmings of the upper stories, which will be of light grey hydraulic pressed brick.

Charles H. Ingersoll, vice-president and active head of Robert H. Ingersoll & Bros., makers of the famous dollar watches, is president of the Commonwealth Hotel Construction Corporation, the company which is to erect the hotel. Thirty widely-known merchants and financiers are to be associated with Mr. Ingersoll as directors. The hotel will be owned and operated upon a co-operative plan, with approximately 150,000 shareholders.

Starrett & Van Vleck and Beverly S. King & Shiras Campbell, two noted firms of architects, have collaborated in producing the plans of the Commonwealth.

The Radical Building Act of New York City

Restricts Building Construction Along the Lines of Use, Height and Area

SEVERAL misconceptions as to the Building Act recently passed by the Board of Estimate have been cleared up, and while there are hints of possible lawsuits to be brought by individual property owners, the city officials who are responsible for the radical departure are sure the majority of the real estate men will approve their action and that the citizens generally will be highly pleased when the new scheme begins to show results.

Mr. Edward M. Bassett, chairman of the special commission which worked on the plan, made it clear that there is nothing irrevocable about the decision of the board, while members of the committee on city plan, explaining the details of the act, pointed out that no existing condition is changed, and that, therefore, the results of the new system will not be apparent for some time and will come gradually.

"The work of perfecting the plan can go on indefinitely," said Mr. Bassett, and he explained that 20 per cent of the property owners within a district can appeal to the Board of Estimate to change the character of the district, and that, if 50 per cent appeal, the board must act within ninety days, so that it is always possible to change a district from a residential section to a business or industrial section within three months,

Robert H. Whitten, secretary of the commission, said:

"The plan does not propose to put New York City in a straightjacket, but it will alleviate the growing pains from which the city has been suffering owing to haphazard, unregulated building development."

Will Not Abolish Skyscraper

Stress was laid by the officials on the fact that the plan does not contemplate the abolitiou of the skyscraper or the driving of industrial and business establishments out of the city. It does contemplate the prevention of the interference of one form of business with another, such as recently led the retail stores to boycott certain establishments which leased lofts in their neighborhood.

The plan, which became effective with the opening of the Building Department yesterday, restricts building in the entire city along three main lines—use, height and area. The most important and most radical restricting is with reference to use, and the plan under this heading divides the city into districts of three classes—residence, business and industrial, or unrestricted districts.

About two-fifths of Manhattan is restricted to residential purposes. In such districts there may be built houses, tenements, apartments, hotels, schools, hospitals and structures of that character. Most of the two-fifths referred to lies above Fifty-ninth street, but there are similarly restricted areas in the Greenwich Village, Chelsea section and on the lower East Side.

Substantially all of Manhattan above Twenty-third street, except along the North River front as far north as Seventieth street, and along the whole of the East River front, is restricted against industrial establishments such as factories of all kinds, lofts used for the making of large quantities of goods, and garages intended for the accommodation of more than five automobiles, such as cab garages.

Some Industrial Restrictions

In addition certain thoroughfares are restricted against "industrial" buildings in favor of business structures. In the same way parts of Fifth and Park avenues, and Central Park West, and the whole Riverside Drive, and parts of Washington Heights, are restricted as residential sections against both business and industrial establishments.

Most of the lower East Side is restricted against industrial establishments, except along the river, and over twenty blocks of the East Side is restricted residential property under the new act. A goodly number of the streets, however, are business streets.

What applies to Manhattan applies to the other boroughs in a general way. The sections near the waterways and the railways are open to all sorts of industrial and business enterprises; the side streets and the hilly sections are restricted as residential territory, and the main arteries of traffic, along the trolley lines for instance, are restricted against industrial structures in favor of business, which means practically all forms of commercial activity except manufacturing. The strictly residential districts are greater in extent in the outlying sections of the city. There are many districts where, on the petition of the property owners themselves, the restrictions have been so laid against business establishments that it may be a mile from a house to the nearest drug store.

It would be quite possible, under the new act, to duplicate the Woolworth Building on the block on Broadway, directly to the north; so it may be seen that the skyscraper need not disappear. The Metropolitan Life Building might be rebuilt too. Both these buildings face parks. The Equitable Building, however, which is thirty-two stories, or 535 feet in height, could not be duplicated on its present site. The new provisions would necessitate the main structure, at the street line, being kept within a height of 200 feet, but a tower 80 by 100 feet might rise from the centre of the plot to almost any height.

STREET WIDTH A FACTOR

The width of the street on which a new building will face will determine the height limit. There are "one time," "one and a quarter time," "one and a half time," "two time" and "two and a half time" zones. In the two time zones buildings may be built at the street line, twice the width of the street, as, for instance, on a hundred-foot street the height of the main part of the structure may be 200 feet high. Above that point the structure may be carried up, by mansards or a "step" arrangement, at a given ratio, as, for instance, in two time zones the extended portion must be set back from the street line in the ratio of one foot horizontally for each five feet above the prescribed limit at the street line.

The lower part of Manhattan will be open to the construction of the largest type of building permissible. Below Fifty-ninth street, generally the limit will be about 120 feet at the street line, but there are streets where buildings 200 feet may be built. Fifth avenue, above Thirty-second street, is practically in a zone by itself, a one and one quarter time zone, where the limit will be about 125 feet, or about the height of the University Club Building. On Park avenue the limit will be 200 feet; on Madison avenue, 160 feet.

The built-up portions of Brooklyn will come substantially under the same restrictions as apply to Manhattan. However, three-fifths of the greater city will be one time territory, devoted mainly, of course, to residential structures.

Apartment Houses Hit

The restrictions as to area are not materially different from those which applied previous to yesterday, though on buildings of a height greater than 100 feet the courts and light shafts must be larger than formerly. In the residential districts, too, the area restrictions are such that the most prevalent type of apartment house may not be built. More room must be allowed in and around the structure.

In special "villa districts" the restrictions are such that the building may not be higher than the width of the street, nor cover more than 30 per cent of the lot. It must be fully detached, and there are restrictions as to the space between buildings and the yard space in the rear.

The new Board of Appeals recently appointed by the Mayor will handle specific cases of protest against the restrictions.

A HALF-YEAR'S FIRE LOSS

The losses by fire in the United States and Canada during June this year, as compiled from the records of *The Journal of Commerce and Commercial Bulletin*, aggregated $12,247,500, as compared with $10,893,950 for the same month last year and $29,348,000 in June 1914, when the Salem conflagration contributed $13,000,000 of the total. The losses for the first half of 1916 reach a total of $125,776,420, as compared with $92,391,000 charged against the first six months of 1915 and $133,018,250 in 1914. The following table gives a comparison of the fire losses for the first six months of 1916 with those of 1915 and 1914, together with the monthly losses for the balance of those years:

	1914	1915	1916
January	$23,204,700	$20,060,600	$21,423,770
February	21,744,200	13,081,250	24,770,770
March	25,512,750	18,786,400	38,680,250
April	17,700,800	18,180,350	12,681,050
May	15,507,800	11,388,450	15,973,500
June	29,348,000	10,893,950	12,247,500
Total six months	$133,018,250	$92,391,000	$125,776,420
July	17,539,800	9,006,800	....
August	11,765,650	10,067,100	....
September	14,383,050	14,823,500	....
October	14,004,700	14,465,850	....
November	21,372,750	21,204,850	....
December	23,507,150	20,877,100	....
Total for year	$235,591,350	$182,836,200	....

There were during June 150 fires each causing an estimated property damage of $10,000 or over. This compares with 215 such fires in May and 191 in April. A detailed list of these June fires appears on the insurance page of this issue. Classified according to their destructivenss they afford the following comparison:

Estimated Loss	Number of Fires
$10,000 to $20,000	49
20,000 to 30,000	26
30,000 to 50,000	21
50,000 to 75,000	18
75,000 to 100,000	8
100,000 to 200,000	18
200,000 and over	10
Total	150

The ten fires during June credited with causing losses of $200,000 or over were the following:

Location—Description	Amount
San Francisco, Cal., pier and freight	$750,000
Wilmington, Del., department store and others	400,000
Milwaukee, Wis., several business buildings	300,000
Parkersburg, W. Va., lumber yards	200,000
Baltimore, Md., grain elevator	1,250,000
Stevens Pottery, Ga., sewer pipe and clay works	500,000
Chicago, Ill., ink manufacturing plant	200,000
Cleveland, Okla., five oil tanks	500,000
Pittsburg, Pa., chemical plant	300,000
Seattle, Wash., steamship piers	500,000

It seems quite evident that the fire underwriters are not likely to have a good year unless the losses are abnormally light during the latter half of 1916. Some of them have had a hard experience so far.

A Suggested Building Coae for Municipalities

By Virgil G. Marani

Virgil G. Marani, Civil and Consulting Engineer of Chicago, and widely known throughout the country as an authority on building codes, was formerly the building commissioner of the city of Cleveland. His experience with the Cleveland code and with codes which he has prepared for other cities has resulted in the preparation of the following code, which will be outlined from month to month in the various issues of CONSTRVCTION. *There are a few provisions in Mr. Marani's code with which* CONSTRVCTION *is not entirely in accord, and these will be discussed as they may come up; but taken as a whole it is a practical, workable code, throughout which is sounded the note of sensible fire protection and it should be of interest to every community which is struggling with the problem of properly controlling building regulations.*—Editor.

Introduction

THIS Building Code is written for the purpose of aiding your Municipality in the proper control of its Building Regulations.

Repetition has been purposely indulged in, primarily to emphasize important and necessary requirements; also to eliminate, as far as possible, all cross references; and to practically make each title a separate Regulation.

The following ten titles cover practically all of the essentials necessary to sane and safe building construction:

Title I (General Index, optional) and Administration. Fees.

Title II Definitions, Engineering, Reinforced Concrete.

Title III Class I Buildings.

Title IV Class II Buildings.

Title V Class III Buildings.

Title VI Class IV Buildings.

Title VII Chimneys, Flues, Gas Fitting, Heating and Electric Wiring.

Title VIII Plastering and Lathing.

Title IX Gasoline Storage, Etc. Garages.

Title X Plumbing and Drainage. Fees.

Each of these titles should be separately bound and indexed, and a general index of all ten titles might be placed before the Administrative sections. By this system, only such portions or titles as are deemed necessary need be adopted at a time, additional titles being enacted when the growth of the Municipality makes additional building regulations necessary.

Buildings have been divided into the following four classes, viz.:

Class I "Fully Protected," generally known as "Fireproof."

Class II "Partially Protected," generally known as "Semi-Fireproof," or Slow Burning. Buildings of Mill Construction, equipped with approved automatic sprinkler systems, are included in this class.

Class III Ordinary Construction, viz.: Buildings with masonry walls and interior of ordinary frame construction. (Interior Combustible.)

This class of building may be *"Temporarily Protected"* against the action of fire.

Class IV Frame Construction. Building entirely of frame (combustible).

This class of building may be *"Temporarily Protected"* or *"Not Protected"* against the action of fire.

Buildings of Class III (Ordinary Construction) and Class IV (Frame Construction) that are *"Temporarily Protected"* against fire, are permitted a greater height and floor area than buildings of the same class constructed without such protection.

In general, the following order has been observed in titles governing the construction of buildings:

Uses permitted for the Class of Building.
Height permitted for the Class of Building.
Area permitted for the Class of Building.
Courts, Yards, Etc., Necessary.
General Description of Building.
Quality of materials to be used.
Footings.
Foundations.
Masonry, Hollow Tile and Concrete Block (Bearing Walls).
Masonry (Non-Bearing Walls).
Steel Construction.
Timber Construction.
Stairs and Stairways.

Deviating from the average building code, the classes of buildings are but four in number. Much desired and wider recognition has been given to the proper and sane use of the following materials for roof, floor and enclosure construction, for protection of steel, for incombustible partitions, and for incombustible lath in all buildings.

Hollow Building Tile, Hollow and Solid Gypsum Tile, Hollow Cement Blocks, Gypsum Plaster Board, Gypsum Plaster Fillers, Metal Lath, Gypsum for the Protection of Steel, Etc., Etc.

The more general use of these materials, following present Standard Engineering and Architectural practice, will encourage a better and less "combustible" type of construction, and also have a tendency to reduce the cost of buildings that are of "Fully Protected" (Fireproof) construction.

Class IV Buildings, when "Not Protected," should not be allowed within the fire limits of municipalities having such boundaries, and if such fire limits are thickly populated and congested, any building of Class IV should be prohibited within such fire limits.

Since about 99 per cent of all building construction is *combustible,* this suggested code provides for, and encourages better construction of such buildings by including *"Temporarily Protected"* buildings of this class.

In general, the regulations providing for quality of building materials and construction, are the *minimum* necessary for good and safe construction.

The use and application of materials, where such materials can be used; materials permitted in "Fully Protected" (Fireproof) buildings, and the permitted use of *incombustible* construction in such structures; is generally based upon the following most recently enacted building regulations, viz.: "The 1915 Edition of the National Board of Fire Underwriters Building Code, and the 1915 Codes of New York and Troy, N. Y."

Regulations for Public Buildings

Regulations governing Theatres, Assembly Halls, School Buildings, and structures of a public character have not been included, because this class of buildings is usually governed by State Code legislation or by previously existing ordinances.

When deemed necessary to include provisions for such buildings in this Code, no change need be made in the class of construction of buildings as given in the various titles. An additional title can be written covering public buildings with the following basic principles to work on:

Seating Capacity.—The seating capacity, or people accommodated in public buildings, may be arrived at by dividing the available floor and stage are by—

(15) For Schools, Libraries, Museums, Churches, Dance Halls and similar buildings.

(5) For Theatres and similar buildings.

(5) to (10) For private Club House Halls and similar uses (according to judgment).

Means of Exit.—Having arrived at the seating capacity, the means of exit, width and number of stairways and similar regulations can be decided on by requiring not less than 3 feet of exit door and stair width for each 100 or less people accommodated. This requirement may be increased or decreased according to the class of construction of the building used for such public purposes, the combustible building, of course, requiring the *maximum* conditions.

Building.—Combustible buildings (Buildings of Class IV) should only be used for public purposes on the first or ground floor, and then for small seating capacity, as the class and character of building improves (viz., is a building of Class III, II or I), the use of such building for public purposes can be considerably extended, not only as regards the seating capacity, but also the height (from the grade level) of such portions of the building as will be so used.

Title X, the Plumbing Section of this code is largely the work of H. J. Luff, Sanitary Engineer, Cleveland, Ohio, and consists of a combination of the best portions of the Ohio State and the Cleveland, Ohio, Plumbing Codes.

SECTION 1—ADMINISTRATIVE, BUILDING INSPECTOR, PERMITS, ETC.

(*a*) *Appointment of Building Inspector, Etc.*

The Council deems it necessary to create, and there is hereby created, the office of Building Inspector. Such Building Inspector shall be appointed by the Mayor and confirmed by the Council, for a term of one year, beginning the first day of January of each year, and shall hold office until his successor is appointed and qualified.

The Council, with the approval of the Mayor, at the time of his appointment and confirmation, shall fix the salary of said Building Inspector.

Nothing herein contained shall prevent the person holding such office from also holding other public office, as the Council may prescribe.

The Mayor may appoint such assistant or assistants to the said Building Inspector as may be deemed necessary, such appointments to be subject to the approval of the Council, who shall also fix the compensation to be paid such assistants, subject to the approval of the Mayor.

(b) TIME REQUIRED OF BUILDING INSPECTOR

The Building Inspector shall give such of his entire time to the performance of his duties as may be required, and during his term of office neither he nor his assistants shall be employed or engaged, directly or indirectly, in any building business or superintendence, or enter into any contract for building for others, or for furnishing materials, plans or specifications for others.

(c) INSPECTION OF EXISTING BUILDINGS

The Building Inspector shall have authority to inspect, or cause to be inspected, any building or structure within the corporate limits of the .... when such building or structure is to be changed or altered as follows:

Moved, raised, altered, or added to.

Repairs following damage by fire or by any other cause.

Any change of occupancy or use.

Any floor loading deemed dangerous, or any changes or addition in the loading of floors.

Any change in the doorways, passageways, stairways, fire escapes or other means of egress.

Any change in the heating, wiring, gas fitting or plumbing.

(d) Changes Ordered by Building Inspector

The Building Inspector shall have authority after such inspection to direct such changes in the supports, floors, columns, walls, doorways, stairways, fire escapes, etc., as his examination deems necessary to insure the safety of persons, the building or structure, and adjoining property.

(e) Failure to Comply With Changes Ordered

If the owner, agent or person in possession, charge or control of such building or structure, or part thereof, when so directed, shall fail, neglect, or refuse to place such building or structure, or part thereof, in a safe condition, and to adopt such measures as shall have been specified by said Building Inspector within a reasonable time, then the Building Inspector may cause such building to be vacated, preventing the use of said building for any purpose whatever, until same is placed in safe condition by the owner, and if such building or structure is dangerous to adjoining property, the said Building Inspector may order or cause such work to be done as may be necessary to remove all danger, charging the expense of such operations upon the tax duplicate, as a lien against such property.

(f) Bond of Building Inspector

The Building Inspector, before assuming the duties of his office, shall execute a bond for............. with such surety as the Mayor shall approve, to the ...., conditioned upon the faithful performance of the duties of his office, which bond shall be for the benefit of any and all parties aggrieved by the acts or neglect of said Building Inspector or employees.

(g) Duties of Building Inspector

The Building Inspector shall be charged with the survey and inspection of buildings and structures, with the enforcement of this code and all other laws and ordinances relating to the erection, construction, alteration, repair, addition to, raising or removing of, change of use or occupancy, and safety of buildings, structures, elevators, heating apparatus, gas fittings, electric wiring, house drainage and plumbing, boilers, fire escapes, stairways, exits, fire protective construction and devices, and the abating of the smoke nuisance by smoke prevention. He shall pass upon questions relating to the strength of buildings and structures, and the quality of all structural material.

He shall approve, or cause to be approved, all plans and specifications submitted, before a permit for any construction purpose is issued, and when such plans and specifications comply with the requirements of this ordinance, he shall see that the required permit is issued.

(h) Building Inspector to Prosecute

He may cause the prosecution of any person violating any of the building regulations of the.............

(i) Building Department Records

The Building Inspector shall keep, or cause to be kept, in a proper filing system, records of the location and character of every building operation for which a permit is issued.

Records shall be kept of all inspections and reports made.

(j) Building Department Monthly Report

A monthly report shall be made to the Mayor covering the work of the Building Department, and the building operations of the.........for which permits were granted.

(k) Building Department Yearly Report

A yearly report shall be made to the Mayor during the first week of December in each year. Such report shall contain all the information necessary to show the class, character and cost of each and all building operations in.........during the preceding calendar year. A statement showing all fees collected and the cost involved in making building inspections, etc., shall accompany such yearly report.

(l) Permit to Build

Before commencing the erection, construction, installation, enlargement, raising, alteration, repair or removal of any building, structure or wall, heating, gas fitting, electrical work, house drainage, plumbing or elevator work, or any part thereof, in the.........., a written permit therefor shall first be obtained by the owner or his agent, the architect or builder, from the Building Inspector, or someone duly authorized by him to do so.

It shall be unlawful to commence any such work unless a written permit so to do shall first be obtained.

(m) Schedule of Fees for Water Rates

No permit shall be granted for the erection, alteration or repairing of any building or structure unless the owner first furnishes the Inspector of Buildings with a certificate from the Water Works Department, stating that all its rules and regulations in regard to the use of water for his building operations have been complied with. When no meter is to be installed, the Inspector shall make out and furnish the owner the quantities of building materials for which water is used in construction, and estimate the amount of the charge to be paid to the Water Works Department, as follows:

Perch Work—Stone footings, etc. .	1c per each 10 cu. ft.
Cement Sidewalks and Floors, concrete	1c per each 10 cu. ft.
Brick Work....................	1c per each 10 cu. ft.
Fireproof Floors, tile facings and partitions	1c per each 20 cu. ft.
Fireproofing Concrete..........	1c per each 10 cu. ft.
Tile Partitions (not over 6 inches thick)	1c per each 40 sq. ft.
Plastering	1c per each 10 sq. yds.

(n) SCHEDULE OF FEES FOR BUILDING PERMITS

The fees to be paid shall be determined in the Department of Buildings, and shall be noted on the application when approved for the issuing of the permit. The said fee shall be paid to the.........., who shall give receipt for the same; upon the presentation of this receipt by the owner, architect, builder or agent, the permit shall be issued to the applicant. The fees to be paid shall be as follows:

(1) For all new buildings and structures, one ($1.00) dollar; for all new additions and alterations, which change the height, area, classification, use or occupancy of the buildings, fifty (50) cents; to which shall be added the following:

For all classes of buildings the charge shall be ten (10) cents for every one hundred (100) square feet of floor area in each and every floor to be built, altered, or affected by change in class, use or occupancy. The character of the first story of a building shall determine the class of building.

Measurements must include all bays, balconies and porticoes; also all inner, interior, lighted, open and recessed courts, together with all interior and exterior walls.

(2) When a building is not divided into stories or galleries, each section of twenty (20) feet, or part thereof, of height shall be deemed a story. This provision shall also apply to roofs, attic spaces, roof appendages above attic floor line, and all free standing lowers, elevators, chutes, theatres, halls, etc.

(3)) Basements, cellars and attics in Third (III) and Fourth (IV) Class buildings will not be included in fee area, unless same are more than fifty (50) per cent occupied for billiard, living, toilet or other rooms.

Basements, cellars and attics in all First (I) and Second (II) Class buildings must be included in fee area; each basement or attic being considered a floor.

(4) The charge for a partial building permit for erecting the foundation or basement walls in advance of the superstructure, or for retaining walls, shall be one ($1.00) dollar in addition to the amounts prescribed in this section.

(5) Fees for one-story open shelter or storage sheds, barns, carriage-houses, garages or arbors occupying more than three hundred (300) square feet and less than six hundred (600) square feet of ground area shall be fifty (50) cents. All such structures three hundred (300) square feet of ground area or less shall be free, but proper situation plan in any case must be submitted and approved by the Building Department before permit will be granted.

(6) The fee for a permit to erect any kind of bridge or connection between buildings, or from a building to grade, shall be fifty (50) cents.

(7) The fee for any separate permit for the erection, installation or placing of any elevator, lift, crane, derrick, heating, gas-fitting or lighting apparatus shall be fifty (50) cents.

The fee of two ($2.00) dollars shall be paid when any elevator, crane or derrick is temporarily or permanently installed, tested and inspected. On the payment of such fee by the owners, agents, lessees or managers of all buildings or property containing said devices, the Inspector of Buildings shall issue a certificate of inspection good for one (1) year from date of examination.

(8) Fees for permits for the erection of permanent observation stands shall be the same as prescribed for buildings in Paragraph (n) 1 and 2.

(9) The fees required in connection with plumbing work shall be given in detail in the plumbing code (see Title X).

(o) REVOCAL OF PERMITS

When the work for which any building permit was issued is not being constructed in conformity with the plans, specifications or statement upon which such permit was issued, the Building Inspector shall notify the owner or owners, or his or their agent, in writing, that such work must be suspended until a permit for any changes desired is obtained, or that all work shall be made to conform to the detailed statements, plans, etc., upon which the permit was issued.

If the owner or owners, or his or their agents, fails to comply with the said notice on the said service thereof, it shall be the further duty of the said Building Inspector to revoke said permit. Notice that the permit is revoked shall be posted in a conspicuous place on the premises upon which violations of this ordinance exist, and it shall be unlawful for any person or persons to perform any work in or about such portion of said structure or building as may constitute a violation, or to use or allow to be used any such portion of such structure for any purpose. (See Par. v.)

(p) APPLICATION FOR PERMIT TO BUILD

Application for all permits shall be made in writing to the Building Inspector by the owner or his agent, the architect or builder, upon blank forms furnished by the Building Department.

(q) INFORMATION ON APPLICATION

The said application shall include a detailed statement, in writing, giving the estimated cost of the building or structure, the location and intended use thereof, giving the allotment, number of sub-lot, street number and name of street or alley, and the name of the owner or owners of said building or structure.

(r) DRAWINGS REQUIRED

All applications for permits to erect, enlarge or alter buildings or structures shall include two sets of the following drawings, drawn upon paper or cloth in ink, with all necessary dimensions shown in figures. Such drawings shall be executed by an Engineer, Architect or Builder of recognized ability, and shall contain the names and addresses of the owner or owners, and the maker of the plans:

First. A situation plan, showing on a suitable scale, with dimensions marked thereon in writing, the location of all buildings or structures for which a permit is desired, together with the location of existing buildings or structures on the same lot, and the location of any buildings or structures within twenty-five (25) feet of the lot lines of the lot upon which the work for which permit is desired is to be erected.

Second. Sufficient plans, elevations and cross-sections drawn to a scale of not less than ¼ inch to the foot, to clearly show all details of construction, the framing of floors and roofs, details of trusses and girders, the size and location of all footings, walls, columns, piers and chimneys. The location of heating apparatus, electric outlets, plumbing fixtures, drains and sewers.

Third. When required by the Building Inspector, the applicant for a permit shall furnish duplicate sets of specifications, which shall contain full and complete information as to the extent and character of the work.

(s) SURVEY REQUIRED

Whenever application is made for the erection, raising, enlarging or moving of any building or structure built upon street lines, or the lines of any public property or space, the situation plan required by this Section, Paragraph (r) shall be accompanied by a plat of the survey of the lot upon which the building or structure stands or is to be erected, showing the figured length of the lot lines, the grades and elevations of the curb, sidewalk, street or public space adjacent to said lot. All locations and elevations shall be arrived at from recorded public bench marks and monuments. Stone monuments or iron stakes shall be used to clearly define the street lines.

(t) PEMITS FOR STABLES, ETC.

Permits shall not be issued for the construction of: stables, slaughter houses, smoke houses, rendering works, stock yards, poultry dressing establishments, sausage factories, meat and fish markets, milk depots, milk shipping and receiving stations, creameries, ice cream factories, canning factories, bakeries, cheese factories, garbage disposal plants, swine, goat and hog pens, or structures for sheltering animals or fowls, or for converting old buildings or structures to such uses; until application for same has been submitted to and been approved by the Board of Health or authorized Health Officer.

(u) APPROVAL BY HEALTH OFFICER

The said Board of Health or authorized Health Officer shall instruct the Building Inspector in writing upon such sanitary measures as shall be deemed necessary before permit to erect buildings or to use buildings for the purposes mentioned in Paragraph (t) shall be granted. Upon agreement by the owner to comply with and fulfill all Health and Sanitary requirements, and compliance with sections of this ordinance relative to plans, locations and construction, the Building Inspector shall issue the permit.

(v) UNLAWFUL TO MAKE CHANGES

It shall be unlawful to make any change in the construction, design, location and layout of any building or structure during the progress of construction.

If it is desired to make changes of any class or character, or in any way deviate from the terms of the application, plans and specifications upon which the permit was issued, notice of such intention to alter or deviate shall be given in writing, together with any necessary plans, to the Building Inspector, and his written assent shall be obtained before such alteration or deviation is made. (See Par. o.)

(w) PERMIT—WHEN TO ISSUE

When the application, plans and specifications conform to the requirements of this ordinance, the Building Inspector shall issue, or cause to be issued, the necessary permit, and one set of such plans and specifications, stamped with an official stamp or otherwise marked as "Approved," shall be returned to the person making the application, for the use of the contractor or builder.

(x) PLANS KEPT UPON THE WORK

The stamped plans and specifications upon which approval and permit have been obtained shall be kept on the building or work until such buildings or work have been completed and the completed structure or installation has been finally inspected and approved by the Building Inspector.

WORK TO CONFORM TO ORDINANCE

All work to be conducted by permit issued therefor shall be done in conformity with the provisions of this Ordinance.

(y) TIME LIMIT OF PERMITS

After a permit has been issued, same may be revoked if work for which such permit was issued is not commenced within four (4) months from the date of issue.

(z) PENALTY FOR VIOLATION

The owner or owners of any building, structure, wall, platform, staging or flooring, or part thereof, where anything in violation of this ordinance shall be placed, or shall exist, and any architect, builder, plumber, carpenter, mason, or other person, firm or corporation who may be employed to assist in or on said work, and who shall violate any of the provisions of this ordinance, or fail to comply therewith, or any requirements thereof, or who shall build in violation of any detailed statement of specifications or plans submitted and approved thereunder, shall, for each and every such violation, or non-compliance, be guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than five hundred ($500.00) dollars.

SCHOOL FIRES IN MASSACHUSETTS

Of the twenty-six school fires that occurred in Massachusetts during 1915, seven were in Boston, the remaining nineteen happening in various parts of the State.

Statistics have been prepared by Fire Prevention Commissioner O'Keefe for presentation to the committee which has in charge the question of safeguarding school houses for next year's Legislature. Of the Boston fires, two were in public schools and five in private schools. For the rest of the State, twelve fires were in public schools and seven in private schools. During the previous year there were thirty-three school fires in the State. For other years statistics are not available. The fires in the metropolitan district from September, 1915, to July, 1916, were as follows:

Jamaica Plain.—Leo XIII School, September 9, 1915; basement; lockers contained rubbish and other combustible material; cause unknown.

Dorchester.—St. Joseph's Convent, January 7, 1916; third floor; spontaneous combustion from painters' rags.

Everett.—Mount Washington School, January 24, 1916; roof; spark.

Boston.—Baldwin School, February 2, 1916; basement; in closet; heat from furnace pipes ignited inflammable material or wooden floor above furnace.

Medford.—Medford Grammar School, February 9, 1916; basement; cause unknown.

Malden.—Cheverous Centennial School, February 16, 1916; basement; unknown cause; among six or seven bales of waste paper stored in duct.

Medford.—Medford Grammar School, March 23, 1916; third floor; set by small boy.

Medford.—Medford High School, March 244, 1916; fire floor; cause defective wiring of electric light system.

Boston.—Boston University, theology school, March 26, 1916; basement; waste paper ignited.

Medford.—Medford High School, March 4, 1916; basement; in closet; cause unknown.

South Boston.—St. Mary's Parochial School, April 27, 1916; basement; cigarette thrown in cotton bunting near assembly hall stage.

Charlestown.—Charlestown High School, May 3, 1916; fourth floor; laboratory; cause unknown.

Fire Losses in Kansas

During May last, according to records carefully prepared by State Fire Marshal L. T. Hussey, 227 buildings burned in Kansas, destroying property valued at $263,231. Of the total number of fires, 19 were directly traceable to poor chimney construction, a danger that has frequently been warned against in the columns of CONSTRVCTION, and one that should be far more stringently regulated by municipal authorities than is now the case.

Fire Marshals' Association to Meet

Nashville, Tenn., has been fixed upon as the place, and November 16-18 the time for holding the next annual convention of the Fire Marshals' Association of North America.

The program tentatively agreed upon includes the presentation of papers upon the following interesting topics:

"What Should be Done in Schoolhouse Buildings?"

"Why a Reduction in Fire Waste Should Bring a Relative Reduction in Insurance Cost."

"Relation of State Fire Marshals to Local Fire Departments."

"Does Civil Service Produce Department Efficiency?"

"Relation of State Fire Marshals to State Fire Prevention Associations."

In addition there will be a round table discussion upon the questions here recorded.

"Value of Education in Fire Prevention."
"How to Conduct an Investigation."
"Theatres and Movies."
"Incendiarism, Overinsurance and Hasty Adjustments."
"Fire Marshal Law."
"Building Codes."
"Municipal Ordinances."
"Gasolene."
"Shingle Roofs."
"Sprinklers."

Inspection Service at St. Augustine

For the first time in its history, St. Augustine, Fla., has inaugurated a system of proper building inspection by specially detailed members of the fire department. Work of this character is of pronounced value, not alone in securing the removal of rubbish and other easily apparent fire breeding conditions, but in educating inspectors and through them the property owners toward correct building practices; knowledge sorely needed in every city and hamlet throughout the country.

St. Augustine is to be complimented upon the initial step in its fire reduction campaign. Now let it be followed by the adoption and strict enforcement of a modern building code, and the fire loss of the historic old city will speedily drop from its present excessive figure to one of very modest proportions.

Additions to the plant of the National Foundry and Machine Company of Louisville will shortly be erected. The estimated cost of the work is placed at $200,000.

Investigating the Use of Engineering and Structural Materials in South America

Wm. Wallace Ewing, Consulting Engineer of Constrvction, Appointed as Special Agent of the United States Government

THE many friends of Wm. Wallace Ewing will be interested to learn that he has just been appointed as special agent of the United States Government for the purpose of investigating the market for structural materials and machinery in the South American field.

Investigations along the line of intelligent efforts to increase our foreign trade have been in progress for a number of years.

The Bureau of Foreign and Domestic Commerce of the Department of Commerce is charged by law with the duty of "developing the various manufacturing industries of the United States and markets for their production at home and abroad, by gathering and publishing useful information, or by any other available method."

The Bureau is a clearing house for commercial information of all kinds, and has a well-organized and efficient system for its collection and distribution. The problem of providing ways and means to this end is receiving more and better attention with each succeeding year. It is attracting to its solution some of the best technical minds.

It is in this Bureau that Mr. Ewing, Member of the American Society for Testing Materials, has been appointed Special Agent.

Civil service examinations for the position were held in twenty-five cities. Nineteen men took the examination. About two-thirds of these passed the examination and in turn were requested to present themselves at Washington for an oral examination before the Appointment Committee. Mr. Ewing was successful in both examinations and has already commenced his duties at the Bureau in Washington.

After an extended trip in the United States in conference with the exporters, receiving their specifications and other information for presentation in the foreign field, a tour of South America will be made, visiting all of the principal centres where engineering and construction materials and equipment are used. Progress reports will be made during this period.

On return to the United States it is planned to revisit the exporters, advising and conferring with them regarding the best methods to be used in developing the sale of their several manufactures.

Wm. Wallace Ewing

Mr. Ewing received the training which has so well fitted him for his new work in the public schools of Rochester, N. Y., at Cooper Union, New York, and from a continued experience in the testing and use of engineering materials and equipment while engaged with some of the largest international engineering and construction companies. Mr. Ewing has turned out an unusual amount of testing work, which is regarded by the engineering fraternity as authoritative. His residence in Spain, some years ago, further qualifies him for the work in the South American field.

Constrvction offers to Mr. Ewing its best wishes in the new and exceedingly important mission which he has undertaken and ventures to predict the unqualified success which must result from the capable, intelligent and thorough methods which have always been applied to the varied activities of his career in the field of construction projects and the testing of materials.

The proper development of the South American market for structural materials and machinery should prove of great value to American manufacturers, and the results of Mr. Ewing's investigation should be carefully considered by those who wish to take advantage of this vast selling field which American enterprise and energy are now opening up.

An Authoritative Opinion

How Professor Ira H. Woolson, consulting engineer of the National Board of Fire Underwriters and one of the greatest authorities of firesafe construction in the country, regards frame dwellings, may easily be inferred from the following statement appearing in the suggested code for the building of dwelling houses, recently prepared under his direction and widely circulated by the National Board.

The quotation:

"Congested districts of frame buildings constitute a distinct conflagration hazard, and a fire well started in such a locality with a strong wind blowing, is exceedingly difficult to control. As a matter of fact such fires seldom are controlled until they burn themselves out, or are blocked by some natural barrier, such as a river, canal, park, or other open space. In their sweep they annihilate everything burnable, and buildings with masonry walls fall with the rest. The truth of this statement has been proven by the sad experience of scores of cities and towns throughout our land, and fully justifies a limitation of height and area for frame buildings in congested districts, as well as restrictions upon their distance apart."

The Fireproof Roof

The Paris (Texas) fire doubtless gave the greatest impetus to the building of fireproof roofs of anything that has ever occurred in the Southwest. Everywhere builders, architects and contractors are investigating the various fireproof roofs on the market. Even the lumber people are advocating certain fireproof creosotes and paints for shingles. It is realized that if every building in a city was supplied with a fireproof roof, the fire loss would be greatly decreased. A large per cent of fire loss is incurred by adjoining buildings catching fire. The roofs offer the greatest surface of inflammable material. A fireproof structure is built with the idea in mind from the foundation up; but if that idea cannot be made universal, then it might be well to start at the top and work down. Partial protection is better than no protection at all. As Paris is rebuilding with fireproof roofs, it would be well for other cities to use this material in the erection of all new buildings, and thus help to avoid a conflagration such as visited that city.—*Texas Trade Review.*

Recommend Changes at Rome, N. Y.

To insure greater safety against fire, insurance engineers recommend among other important changes at Rome, N. Y., a street revision of its present building code, and the inclusion therein of standard fire prevention ordinances.

Fire Hazard at Passaic, N. J.

Reviewing the fire hazard at Passaic, N. J., the engineers of the National Board of Fire Underwriters, after a recently completed survey of the city, report in part:

"In the principal mercantile district buildings are mainly low and areas small, but a large proportion are frame, and fire protective appliances are almost entirely lacking in those of brick. Main avenue and the railroad tracks form an effective fire break, and the conflagration hazard in that section of the district is moderate, but along Passaic street it is high. In the Dundee district the structural weaknesses are very pronounced, the water supply is not available in sufficient quantity, and only at pressures requiring fire engines and the conflagration hazard is high. Manufacturing districts are not compactly built up, and while many of the buildings are very large the attention given to fire protection and prevention makes the hazard small. In residential districts the hazard is marked in sections where shingle roofs prevail.

"Nothing Saved from the Building"

A wire from Dinuba, Cal., announces the burning in that city on June 16th, of "the Chamber of Commerce Building, together with all of its contents, including the city library and all exhibits, which had taken several years to accumulate." The dispatch adds significantly, "the destroyed building was a one-story frame structure."

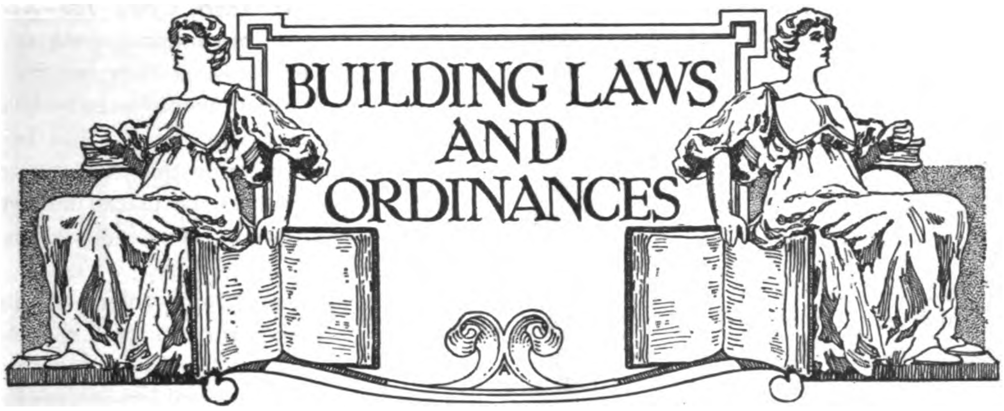
The incident is a sorry commentary upon the business acumen of the Chamber of Commerce members and others responsible for the housing in a highly inflamable structure of records and other exhibits of value "which had taken several years to accumulate."

The property was but partly insured; had it been fully covered by indemnity the condemnation of the responsible interests would be but little less severe, for the value of historic relics cannot be measured in dollars and cents; once destroyed they can never be replaced.

To safely care for properties of this nature their housing in structures as immune from fire as modern practice can make them should be the first consideration.

The experience of Dinuba should prove a warning to all other communities where similar conditions exist.

A ten-story fireproof building will be erected at Kansas City, Mo., for B. L. & Samuel Hoffman, prominent hotel men of that city. The intended structure will cost close to $150,000.



BUILDING LAWS AND ORDINANCES

Use of Hollow Tile at Oakland, Cal.

Under a lately adopted ordinance the use of hollow tile in building construction must be in accord with the following regulations:

"Wherever masonry walls are required in the building law such may hereafter be used under the following additional conditions:

"The term 'masonry' shall apply to brick, stone, concrete, plain or reinforced, or interlocking hollow tile construction.

"The term 'interlocking hollow tile' is hereby defined to mean a tile made of shale, fire or other clay, which, when burned, shall be free from undue checking or warping. Such tile shall be so designed that, when laid in a wall, each unit is locked or bonded into the opposite tile or into the tile immediately above and below; said bond to be incorporated in each tile and be an integral part thereof.

"All interlocking hollow tiles shall conform to the following requirements:

"They shall be burned to such density that, in a forty-eight hour test, they will not absorb moisture exceeding twelve per cent of their weight.

"They shall develop an ultimate crushing strength of not less than fifteen hundred pounds per square inch of their bearing members.

"The allowable stress shall not exceed one hundred and fifty pounds per square inch of net area of bearing members. Bearing members shall mean only such vertical webs or walls of such tiles as will rest on thorough mortar beds and stand in complete vertical alignment with the vertical members of the interlocking hollow tile below.

"The vertical webs and shells of all interlocking hollow tile used for bearing walls shall be in thickness not less than twenty per cent of the cross section measurement of the void they enclose.

Incombustible Roof Coverings

"All buildings hereafter erected of interlocking hollow tile, which comply with the provisions of this ordinance and in addition have an incombustible roof covering as provided for Class C buildings, shall be rated as Class C buildings.

"All exterior and bearing walls of Class C buildings, including shafts and courts, shall be built of brick, stone, concrete or interlocking hollow tile. They may be built as continuous walls without openings, or, if openings occur in the bearing stress, shall not exceed the maximum stress given in Sec. 2.

"Exterior walls of interlocking hollow tiles shall not exceed three stories in height above the basement, and shall be of the same thickness laid up, anchored and built as required for brick walls.

"Walls of interlocking hollow tile may be built supporting a portion of a floor in addition to their own weight, or self-supporting curtain walls only, in which latter case columns shall be built in the wall to carry floor loads. Where walls support floor loads the center of any column or bearing stud partition shall not be more than twenty-four feet from the wall. When columns, as required in this section, are to be built into interlocking hollow tile walls, they may be made of interlocking hollow tile or brick, thoroughly bonded to the tile and formed as pilasters of such thickness as to bring the load on the tile within the limits prescribed in this ordinance, or steel or reinforced columns may be used if the curtain walls are properly bonded to the column and reinforced as prescribed elsewhere in this ordinance.

Exterior Walls

"The thickness of exterior walls of interlocking hollow tile when used in buildings not over fifty feet in width and not more than eighty-five feet in depth, and when used only as a dwelling, lodging house, hotel, tenement house or apartment house above the ground floor, shall be not less than given in the following table, except that party walls shall be four inches thicker:

	Basement	1st sty. 16 ft.	2d sty. 30 ft.	3d sty. 40 ft.
1 story building	13	8		
2 story building	13	13	8	
3 story building	17	13	13	8

"If any story exceeds in height the number of feet prescribed in the table, the thickness of walls throughout such story shall be increased four inches for each five feet or fraction thereof in excess of the tabulated height, but the total height of any building shall not exceed forty feet. Parapet and fire walls shall not be less than eight inches thick.

Class C buildings, one story high and less than one hundred feet in depth, shall have walls ten inches thick, and if more than one hundred feet in depth, shall have walls twelve inches thick, provided that in all buildings over fifty feet wide four-inch pilasters or columns shall be built into the wall at distances of not more than twenty feet on centers and under all concentrated loads.

"Except that one story dwellings not more than thirty feet wide and not more than forty-five feet long may be erected with interlocking hollow tile walls six inches thick.

"Band iron, at least three inches by one-quarter inch, shall be imbedded in the inner half of every interlocking hollow tile wall at every floor and ceiling joist line and shall run continuously around the buiding.

Curtain Walls

"Walls of interlocking hollow tile may be used as curtain walls, subject to the following conditions:

"The thickness of such walls shall be in accordance with the following table based on the area between adjacent columns and the floor beams:

Panels less than 300 sq. ft........	6 in. thick
Panels less than 400 sq. ft........	8 in. thick
Panels more than 400 sq. ft........	12 in. thick

"All such curtain walls shall be reinforced with vertical steel rods not less than one-half inch in diameter, spaced not over twenty-four inches on centers, or horizontal flat or round steel rods spaced not over twenty-eight inches on centers may be used if the area of each rod is at least one-third of a square inch for each square foot of wall in vertical section. All such rods shall be rigidly attached to the steel or reinforced concrete frame. Spandrel and apron walls shall be reinforced as provided for curtain walls. Excepting, however, that in curtain walls less than four hundred square feet in area and twelve inches thick the reinforcing above specified may be omitted.

"All ordinances or parts of ordinances inconsistent herewith are hereby repealed."

Preparing Modern Code for Atlantic City

A revision of the building code of Atlantic City, N. J., to conform to modern requirements for construction and fire prevention is now well underway. The electric wiring of the city has been reinspected, but the recommendation that all wires, except those of the trolley companies, be placed underground, cannot be complied with until an enabling act has been secured from the State Legislature.

Two recommendations looking to the reduction of the conflagration hazard through the correction of defectively constructed buildings, and the general introduction of automatic sprinkler systems in "conflagration breeders," are in contemplation.

By virtue of its generally narrow throughfares, and the inflammable character of many of its hotels and boarding houses, Atlantic City has long been regarded as an unusually hazardous centre by the fire insurance companies, many of which refuse to transact business there at any rate. On the other hand the city officials, recognizing the baneful effect a serious fire would have upon the community, have taken precautions to guard against an outbreak of flames. In the principal hotel district high-pressure water mains have been laid, special fire apparatus housed, and a close system of inspection adopted.

Then, too, the hotels of later construction have paid particular attention to the fire hazard, and have largely eliminated the use of wood and other inflammable material in their building operations.

San Diego, Cal., to Prepare Code

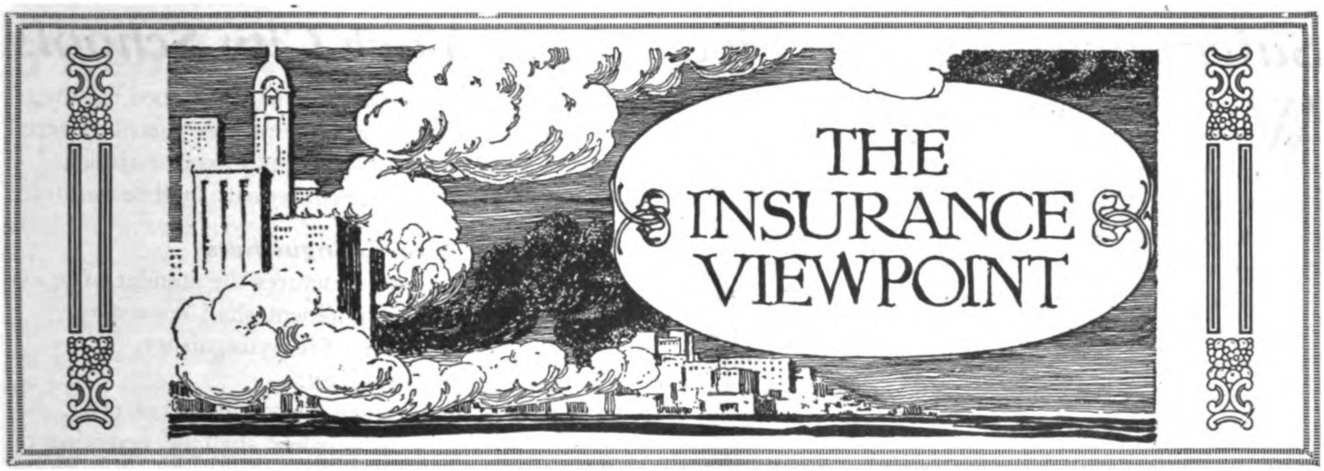
Authority has been given J. E. Fifield, building inspector of San Diego, Cal., to prepare an up-to-date building code for the city.

San Diego has grown remarkably fast in recent years, and the movement, stimulated by the exposition, seems destined to continue indefinitely. It is appreciated by Mr. Fifield that the present building ordinances do not meet existing conditions.

Recasting Code at Indianapolis

Jacob H. Hilkene, Commissioner of Buildings at Indianapolis, advises CONSTRVCTION that while progress is steadily being made in the preparation of a new building code for his city, it will be some time yet before the work is completed. Indianapolis is an important centre, and the Building Commission is studying very carefully the many problems offered in the task of code revision entrusted to it.

Warned by the recent severe fire in their community, the authorities of Crothersville, Ind., are considering a building code, and will likely take definite action upon the subject at a meeting of the town council to be held this month.



THE INSURANCE VIEWPOINT

Exposure Hazard in South Dakota

Within the fiscal year ended June 30 last, 474 fires occurred in the State of South Dakota, resulting in a total property loss, according to Fire Marshal Henry, of $642,194.78. Practically one-fifth of the aggregate loss was caused by fires communicated from adjoining structures, attesting thereby the necessity of not only protecting one's individual property from internal danger, but of safeguarding it from adjacent risks. This means primarily the adoption of incombustible roof coverings, for the great percentage of communicated fires result from sparks falling upon wood covered roofs. That the extreme danger from this source is recognized by those in position to speak intelligently upon the subject, is evidenced by the practical unanimity with which they warn against it.

Improvement at Augusta, Ga.

Shortly after the disastrous conflagration of March 22 last, Augusta, Ga., adopted an entirely new building code, using as its model that suggested for municipalities by the National Board of Fire Underwriters. Speaking of the manner in which the new ordinances are being enforced, Fire Chief Frank G. Reynolds recently said in part:

"The National Building Code has made a wonderful improvement in the new construction work; shingle roofs are prohibited within the city limits on new buildings.

"The 'Board of Examiners,' consisting of two contractors, two architects and the chief of the Fire Department, appointed by the Mayor, to pass on all appeals made from the decision of the building inspector, as to the requirements of the building code. On a vote on an appeal made recently to permit the erection of a frame structure with a metal roof in the fire limits, the vote stood four in favor and one against (I voted against) granting the petition, which is a direct violation of the code. However, I doubt if the City Council will confirm the action of a majority of the Board of Examiners, particularly in the above case.

"R. H. Pratt, of the South Eastern Underwriters Association, is assisting the building inspector in passing on plans and granting permits for same. G. L. Corly, chimney, flue and heating equipment inspector, has had corrected numerous defects in flues and other defects in the residential district. The present fire alarm equipment will be transferred to the old post office building, to be remodeled and ready for the city headquarters of Augusta by October 31, 1916.

"The National Building Code appeared a little drastic to some of the property owners who were preparing to rebuild immediately after the conflagration, but, in my opinion, that is gradually wearing off, as they seem to realize now that it is intended for the best interests of the property owner as well as a stride forward for fire prevention."

Construction at Washington, D. C.

Insurance engineers refer approvingly to the increasing number of fireproof buildings recently erected in Washington, D. C., declaring that because of this fact the fire hazard of the city has been appreciatively reduced. While it is not claimed that fireproof buildings would survive a sweeping conflagration such as obtained a few years ago at Salem, Mass,. and more recently in certain Southern cities, it is indisputably true that structures of the type mentioned act as efficient fire retardants, and advantageously placed would confine even severe fires to restricted areas. Slowly, yet surely, the firesafe mercantile and office structure is gaining in popularity, and the next logical move will be the replacement of the flame-loving wooden homes with those constructed of non-burnable materials.

D. X. Murphy & Brother of Louisville, Ky., have been chosen architects for the city's new $300,000 auditorium.

Safeguards Against Fire in New York City Schools

WHILE all of the public schools erected in New York City during recent years conform to approved firesafe building practice, many of the older structures were sadly deficient in this important respect when the various boroughs were merged with the greater community. To overcome the shortcomings shown to exits, the Board of Education in 1909 adopted a series of rules, the enforcement of which, it was felt, would prevent the outbreak of fire in the school buildings. These regulations have been amended from time to time, as suggested by experience and increased knowledge of the science of fire prevention, and further revision will be made whenever such procedure shall seem advisable, the authorities being determined that no reasonable precaution that will add to the safety of the pupils shall be neglected.

Among other regulations it is demanded by the Board of Education, that each of the buildings under its jurisdiction—

"Shall have a sufficient number of fireproof stairways and of exits to permit of its occupants vacating same in not more than three minutes in non-fireproof, and not to exceed three and one-half minutes in fireproof structures.

"In every case where practicable the floor areas shall be divided by approved fireproof partitions, all openings in which shall be protected by self-closing fireproof doors, and where such provision is made the pupils occupying each side of said partition shall be drilled separately.

"Every building shall have at least two exits, remote from each other.

"All inside wood stairs to be replaced with those of fireproof material, exception being made in the case of small frame schools in outlying sections, where other ample means of exit are provided.

"All stairways of all buildings shall be enclosed on each floor with fire and smokeproof partitions and doors. All such doors to be self-closing.

"Wood doors along the line of exit stairways shall be replaced with doors of fireproof material, provided with self-closing devices.

"Janitors' storerooms, in which supplies such as oil, waste or paint are kept, shall be of metal or other fireproof material with self-closing doors.

"All doors, windows and transoms in storerooms shall be of fire-resisting materials.

"Enclosures of fire-resisting materials must be provided for storage of sawdust and raffia.

"All light shafts shall be constructed of fire-resisting material throughout, or closed up if conditions warrant.

"The ceilings of all boiler rooms, cellars and basements, and all wood ceilings of non-fireproof buildings, to be fireproofed either with plaster board covered with 26-gauge metal or other approved material.

"All frame structures in courtyards shall be removed.

Fire Extinguishers

"For ordinary school structures the standard fire extinguishing appliance equipment shall consist of:

One 3-gallon approved fire-extinguisher.
One 5-pound flat-head ax.
One 6-foot hook (Fire Department pattern).

"One additional extinguisher shall be provided on each floor where classes in carpentry, chemistry, sewing, etc., are located, and in which combustible material of any kind, other than books, is used in connection with school work; and two additional extinguishers shall be provided where such floors cover areas of 10,000 square feet. One additional extinguisher shall be provided for each assembly room where there is more than one assembly room in a building. Where more than one fire extinguisher is installed on any floor of a school building, one-half of the total fire extinguisher equipment may consist of approved one-quart gas fire extinguishers, the remaining half of said equipment to consist of liquid fire extinguishers of not less than 2½ gallons capacity. Note—In no case will it be necessary to order a larger number of one-quart liquid gas extinguishers than are ordered of soda and acid extinguishers.)

Fire Buckets

"Two standard fire buckets, 10-quart capacity, shall be placed in each carpentry classroom.

Automatic Sprinklers

"Automatic sprinklers shall be provided in large storerooms or workshops on first floor or below and in all waste-paper chutes; one being placed at top and one at bottom. All supplies to be from house service.

"Water connection, with length of small hose attached, shall be placed in all furnace rooms for use about ash pits, and similar connections shall be placed where waste paper or other refuse is burned.

Building Inspection at Malden, Mass.

Condemned as being dangerous to life and property, the demolition of 15 buildings was ordered by Deputy Inspector Aylward of the Malden, Mass., Police Department, during one week recently. The authorities of the city are alive to the menace of unsafe buildings, and are conducting a systematic campaign to secure the removal of all such. Their activity in this respect is to be commended, and might with profit be followed by the officials of other communities.

"Twenty-Five Years of American Architecture"

UNDER the above title, A. D. F. Hamlin, in *The Architectral Record* of July, 1916, offers a scholarly presentation of the progress of American arachitecture during the quarter-century from 1891-1917.

"Only," he states, "when we consider concretely what was in existence in 1891 and compare it with what is in existence to-day, do we begin to grasp the extent and significance of this marvelous activity.

"The first ten years of the half-century (1867-1876) saw little or no emergence from the abyssmal depths to which our architecture had sunk in the Civil War period. It was in 1876 that the awakening began. Trinity Church in Boston, the Philadelphia Centennial, the rise of H. H. Richardson, the maturing of the work of architects like R. M. Hunt, George B. Post, McKim, Mead and White, Peabody and Stearns, Ware, Van Brunt and Howe, Burnham and Root and others; the entrance on the stage of architectural practice of scores of trained young men newly from Paris; the establishment of Columbia and other schools of architecture, the opening of new art museums and the expansion of old ones—all these imparted to the architecture of 1876-1891 an exhilaration, an enthusiasm as of a host of winning new conquests, which the older men of the profession can recall, but of which the younger men can have little conception."

Past and Present Opportunities

It is in speaking of the young men of to-day, both those who are beginning to climb the architectural ladder and those who are turning their thoughts in its direction, that Mr. Hamlin presents interesting views.

"The profession," he states, "has in these last twenty-five years grown more mature, and also more sophisticated, more self-conscious. There are a hundred capable architects now where there were ten in 1891—and the ranks are beginning to be overcrowded. The actual achievement has been vastly greater than in the preceding quarter-century; its average performance is vastly superior, its greater masterpieces undoubtedly surpass those of that earlier time; the general public taste has notably risen to a higher level. But the earlier enthusiasm has largely evaporated. The requirements laid upon the architect have enormously increased the complexiy of his task, and the struggle of competition has become intense beyond the limits of a generous and enthusiastic emulation. The commercializing of large building operations has raised new and often embarrassing problems of professional ethics and practice.

"Moreover, the most pressing needs of the nation have been measurably supplied. In the earlier period, the extraordinary awakening of the country to its artistic destitution gave occasion for an equally extraordinary demand for new and better buildings for existing needs. A relatively small body of trained architects had all they could do to supply at the same time this new provision for existing needs, and also that for the constantly increasing new needs of growing communities and freshly-treated institutions. The country was prosperous. The 'New West' and 'New South' were rapidly devloping.

"All these conditions have changed in the last quarter-century. The panics of 1893 and 1907 sadly checked the tide of architectural activity. Strikes and lockouts on a colossal scale, and during the last two years the frightful war in Europe, have again and again thrown the financial and architectural world into confusion. The tremendous tide of western development reached its flood years ago, and if it has not begun to ebb, it is at least quiescent. The country has been fairly well supplied with buildings; over-building is complained of in some of the great centers. The relatively diminished demand for new buildings falls upon a greatly increased army of architects, among whom the prizes are very unequally distributed. It is much harder now than in 1891 for a young architect to start in independent practice, and his chances of securing important commissions are relatively smaller. There are more big firms to absorb these than there were then, and more young architects like himself to compete for what does not go to their big rivals. Undoubtedly the prospects are less certain, less alluring than they used to be.

Architectural Educational Advantages

"On the other hand," continues Mr. Hamlin, "the American architect of the last twenty-five years has enjoyed, and enjoys to-day in increasing measure, a host of advantages denied to the men of earlier days. The facilities for study, the educational resources, have been immensely increased. The volume of architectural literature available in libraries has grown tenfold. The Society of Beaux-Arts Architects has provided every section of the country with ateliers and stimulating opportunities for self-improvement in design and draftsmanship. A remarkable advance in public taste and in standards of performance has made possible a quality of work which was out of the question twenty-five years ago except in a very few centers, and only in exceptional cases in these. The architect of to-day has at his disposal materials and resources, both for construction and decoration, which have been created within the quarter-century. Competitions have been systematized under regulations which have greatly reduced the scandalous practices that used to be rife. The whole profession of architecture has been raised to a higher level in the public esteem, as well as in tone and standards of its own practice. The American Institute and other organized bodies of architects have developed throughout the country an esprit de corps, a solidarity, a community of interest which have more than kept pace with the increasing intensity of competition.

Architectural Progress

During the quarter-century under consideration the most noticeable progress has been that of the development of the steel skeleton and the influence of the great exhibitions, especially the exposition at Chicago in 1893, in which city the steel skeleton was born and first developed, Jenney and Mundie being the architects who "first gave the conception practical form and carried it into successful execution."

In Mr. Hamlin's opinion, "It is fair to consider it (steel skeleton construction) as the fourth of the great structural advances which have given architecture really new resources. The Roman vault for the first time made vastness of unencumbered space attainable. The Gothic ribbed vault and flying arch and buttress created the masonry skeleton and made possible the majestic loftiness and airy lightness of the medieval cathedral; another new architecture was created. The metallic truss, developed towards the middle of the last century, permitted a wholly new spaciousness and lightness of construction; our vast exhibition halls, train houses and armories would have been impossible without it; again a new architecture came into existence, hardly recognized as a new architecture. The steel skeleton of the last four developments has brought into being a new loftiness and lightness of construction; it has freed architecture from the limitations of massive walls which had for ages kept it from soaring otherwise than in the frail and beautiful but practically useless form of the spire. We have not yet solved the problem of the ideal artistic treatment of the skyscraper, but we have gone a long way towards it; and meanwhile our architecture has been endowed with wholly new resources and possibilities."

Mr. Hamlin then goes on to discuss the influence of the Columbian Exhibition, and others at Omaha, Buffalo, Jamestown, St. Louis, San Francisco, San Diego; the educational activities of the past twenty-five years, in which the growing influence of the French school has contributed so powerfully to our architectural inspiration; the splendid work of American schools, the American Institute of Architects, and other educational bodies and the influence which they have exercised.

In a chapter characterizing the architecture of the last quarter-century, Mr. Hamlin cites many buildings, justly deplores the "architectural aberrations" erected prior to the period under discussion; and says, speaking of the years 1891-1916 and the character of work produced during that period, "That it has made remarkable structural advances is evident to anyone who takes the trouble to examine many buildings erected before 1891. Taken as a whole, it is certainly more knowing, more competent than that of the preceding period, better on all four matters of planning, construction, composition and decorative detail. It could hardly be otherwise, given the vast increase in the number of architects and draftsmen trained in excellent schools in this country and abroad; and given, at the same time, the amazing increase in wealth, in general education, in resources of all kinds, of the nation at large during the same period."

Mention is made of "the various phases of the movement for civic improvement, in city planning, garden cities, civic centers and municipal art generally; the great advances in mechanical equipment of buildings, with the attendant increase in the complexities of architectural design and practice; the progress of domestic architecture and especially the Colonial revival in rural and suburban architecture; the emergence of an American school of landscape design; and the extraordinary increase in the variety and improvement in the quality of building materials. The temptation is strong to list the most important events in the nation-wide campaigns for better city plans, for improved tenement housing, for the artistic rebuilding of burned and wrecked cities, for reclaiming waterfronts, for grouping public buildings. It is hard to have to omit all account of the new uses of concrete, hollow tile, Guastavino vaulting, and new kinds and forms of brick, tile, glass and what not."

This instructive article is concluded with a page or two on architectural literature and its relation to architectural development during the past twenty-five years.

In the September issue of CONSTRVCTION will appear

FIRE PROTECTION IN SCHOOLS

BY CHIEF GUERIN

a comprehensive article written by a well-known authority.

SAFE HOMES

A DEPARTMENT OF "CONSTRVCTION"

Devoted Exclusively to the Interest of the Home Builder

Edited by Ralph P. Stoddard

The Increasing Public Demand for Safe Material

THAT the movement for fire elimination by the use of safe materials is making itself felt by the lumberman is disclosed by an examination of any of the lumber journals.

The advertisers have their hands upon the pulse of the buying public, while the editors have an insecure grasp upon the nethermost part of the tail—so to speak. It is not strange, therefore, that while the pen wielders still are calling safe materials "lumber substitutes," their advertisers are admitting the facts and showing their prospective customers the way to take advantage of the changed conditions.

An instance is from a recent number of *The American Lumberman.* In this an advertiser says, "Every day the cry for fire prevention is forcing the limits further out. You might as well meet it squarely to-day as to-morrow," and goes on to show dealers the profitable way to handle business in the outlying districts, where frame construction is permitted.

Many other manufacturers and dealers give notice by their ads that they realize the growing sentiment against flimsy construction. Of these a prominent Southern manufacturer is one. As a horrible example he heads his advertisement with this statement (which he credits to Hoxie): "The entire frame of a factory in Canada was replaced after three years' service," and explains by adding, "Just another example of what 'scalper' methods of delivering inferior structural material did in this instance."

Such cases as these, with the fact of the great number of lumber dealers who have added safe building materials to their stocks, give unquestionable indication that the public is surely—even if slowly—demanding safer and more permanent types of buildings.

Somerville, a suburb of Boston, has an ordinance forbidding the use of wooden shingles upon any building. This, however, is a recent law, and it was so long delayed that the city is penalized by an insurance rate five cents higher than exists in many of the neighboring cities.

A protest on the part of residents caused the National Board of Fire Underwriters to make a thorough investigation.

While this act is in itself interesting, the feature of the report is the comment of the lumbermen's journal upon it.

"The official report of this investigation," states *The American Lumberman,* "has recently been made public, and, as lumbermen here expected from similar experiences, wood comes in for most of the blame, although some criticism is made of the lack of men in the fire department and inadequate water supply.

"There is not a word in the otherwise exhaustive report," continues the lumber paper, "about actual fire statistics; how many fires have spread from supposed fireproof structures to frame buildings, or what proportion, if any, of fires have had their origin in or been spread by the much criticised wooden roof."

This is the pet argument of *The American Lumberman* against any legislation affecting the use of wood in building. "If the city has not burned, why regulate?" that's their cry.

Upon the same basis and dealing alone with the individual and not the masses, the life insurance company would say to each applicant for a policy, "Sir, how many times have you died—we must know your individual death rate?"

Men's lives are insured at a rate based upon the death rate of the country, or upon men of a certain class of occupation in the country. The fire hazard of a city has to be reckoned upon the history of fires in cities throughout the country, and not alone upon the experience of a single city in question.

Chelsea and Salem are close neighbors of Somerville. Both have suffered conflagrations within recent years. Somerville is built as Chelsea and Salem were built and is in the same danger of being wiped out in a single day.

Underwriters' Warning Against Conflagrations

The underwriters' report upon Somerville is a warning to every wooden city of the country. Here are a few lines from it, and it is respectfully submitted to mayors and councilmen everywhere:

"It is toward the conflagration hazard that the wider interest in Somerville's conditions chiefly turns. For through careless laws the city allowed itself to become a classic warning against building residential districts of timber and more timber.

"This wider peril the underwriters' report neither blinks at nor magnifies; it does not cry danger for alarm's sake. It calls the hazard 'normally' severe. It recognizes that in a city so built a sweeping fire is after all a chance, not a certainty. In any city of wooden houses, mostly shingle-roofed, and crowded so closely as to make wooden construction practically continuous, residence takes one outstanding risk; it resembles residence in Galveston before the wall was built against tidal waves or in Messina before earthquakes. If the adverse conditions attack Somerville all at once—a gale, say, and zero weather, signal wires down and two or three strategic hydrants frozen—the conflagration will leave its path marked only by chipped cellar walls and naked chimneys. Meanwhile we may take such comfort as we can in knowing that Somerville now requires all new roof covering to be of products of an incombustible nature; that its aldermen are now busy on a law wisely limiting the renewal of burnable roofings; that under ordinary circumstances and with help from neighbors the city can mass at any threatening fire thirty engines within thirty minutes; and that the chief of its department has made this overshadowing danger his most thoughtful study."

How the S-A-F-E Has Helped to Make Cleveland a Safer City

EVIDENCE of how the movement of the S-A-F-E is helping to make Cleveland a safer city and actually producing hundreds of thousands of dollars' worth of new business for the manufacturers and dealers in fire-resisting materials is evidenced by the following clipping from the Cleveland *Plain Dealer* of Sunday, August 6:

BUILDING PICKS UP IN JUNE AND JULY

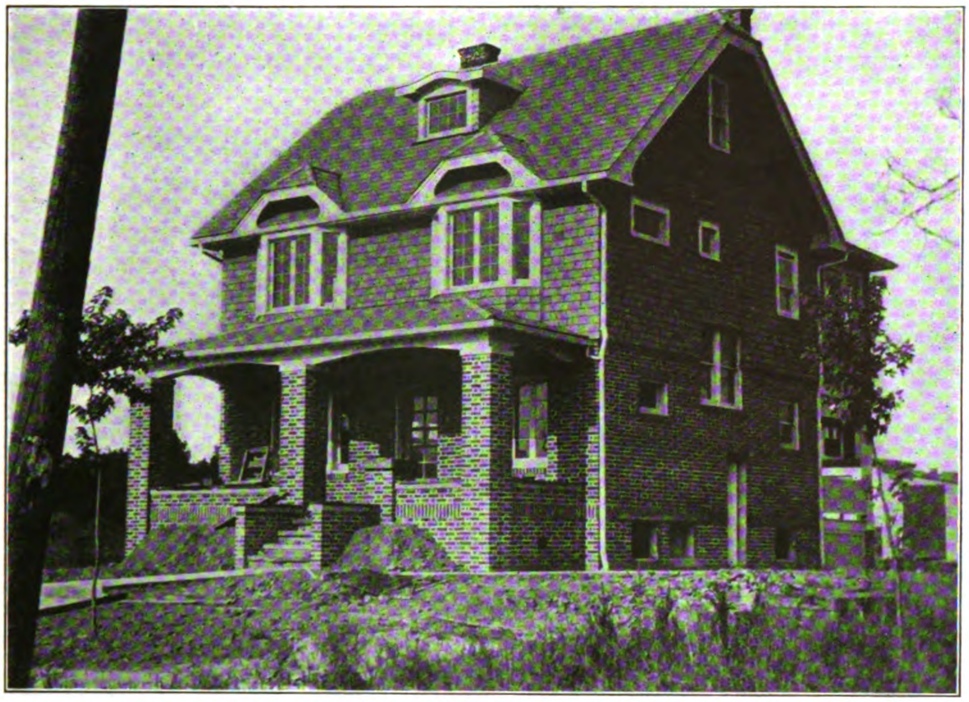
Cleveland's total building volume for 1916 will equal, if not exceed, $32,660,305, the figures for 1915, if a proportionate gain made during June and July is shown for the remainder of the present year, according to statistics just given out by Building Commissioner E. W. Cunningham.

In classifications up to June 1 this year, compared to figures for the same period last year, the following decreases were shown:

Public buildings	$375,000
Schools	415,500
Hotels	635,000
Storage and warehouse	570,945
Factories	999,220
Brick apartments	2,079,100
Minor	100,000
Frame apartments	187,000
Frame dwellings	1,180

Brick additions and alterations showed an increase of $542,275 and brick dwellings $104,800.

Prevention is the Best Form of Preparedness

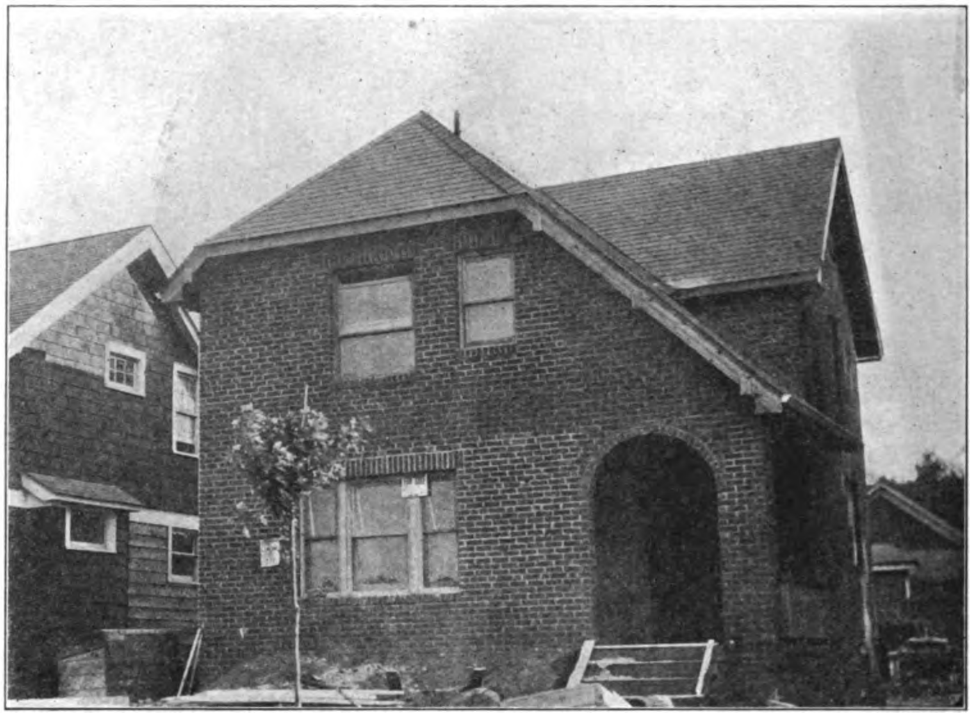


A house in which hollow tile and brick was used for the first story. A couple of hundred dollars would have made the entire house safe, as the roof is of slate. Cost, about $7000

A Practical Demonstration of Safe Home Building

> "It is undoubtedly true that if the facts and statistics were properly marshaled and presented in any community, that the erection of frame property would be practically abandoned, not from compulsion, but from choice."

THE above is a statement made by John J. Thomas, of the Lloyd-Thomas Company, appraisers, Chicago. Mr. Thomas is in no way interested in the building material business, but during the campaign for an extension of the fire limit in Chicago Mr. Thomas was called in by the City Council to give expert testimony upon depreciation of various types of construction. Mr. Thomas' experience covers building appraisals in many cities throughout the country. In one instance he appraised every building in an East-



A consistently fire-safe cottage at a cost of $3500. Built by the Brick Homes Company. Constructed with facing of birck over hollow tile and with slate roof

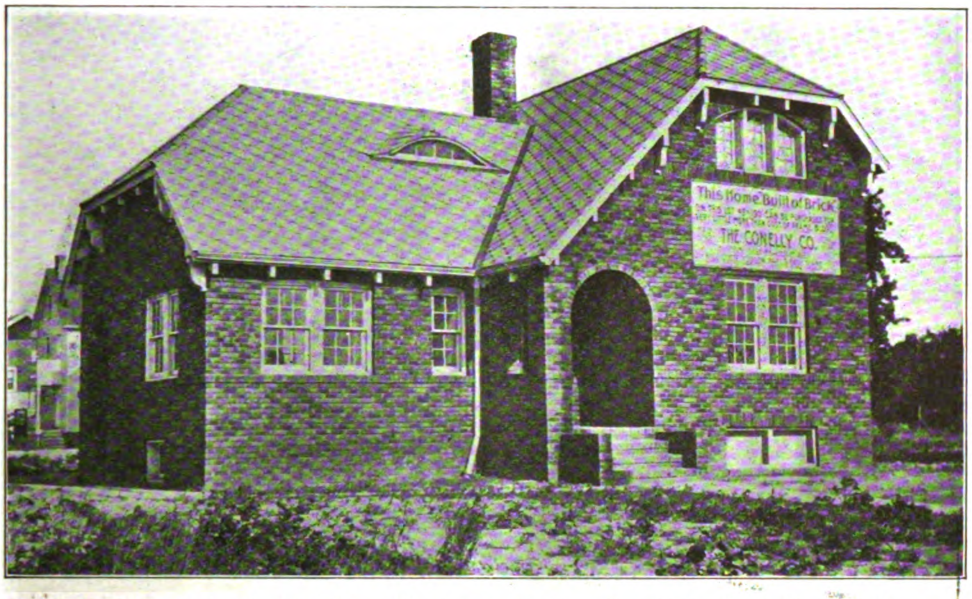
ern city. The findings of Mr. Thomas and other experts influenced the council of the city of Chicago to add more than twenty square miles to its fire limits.

The purpose of this story is to give some practical proof of the paragraph quoted above. It certainly is being proven in more than one community that when the facts regarding permanent and firesafe construction are presented that the building of unsafe homes practically ceases. The illustration accompanying this story shows several firesafe homes erected during the past year in one allotment in the city of Cleveland. There is a lesson in this example for the prospective home builder and for the manufacturer or dealer in fireproof materials as well.

For the prospective builder it simply means that if he will investigate costs and make himself familiar with the advantages and economy of permanent construction, he will build no other type.

For the dealer and manufacturer it means that it pays well to make an effort even if there is only one

EXTERIOR WALLS should be of masonry, in the form of brick, tile, cement stucco, cement blocks or concrete, all of which offer that protection against exterior fires which is so much needed in the construction of the home.

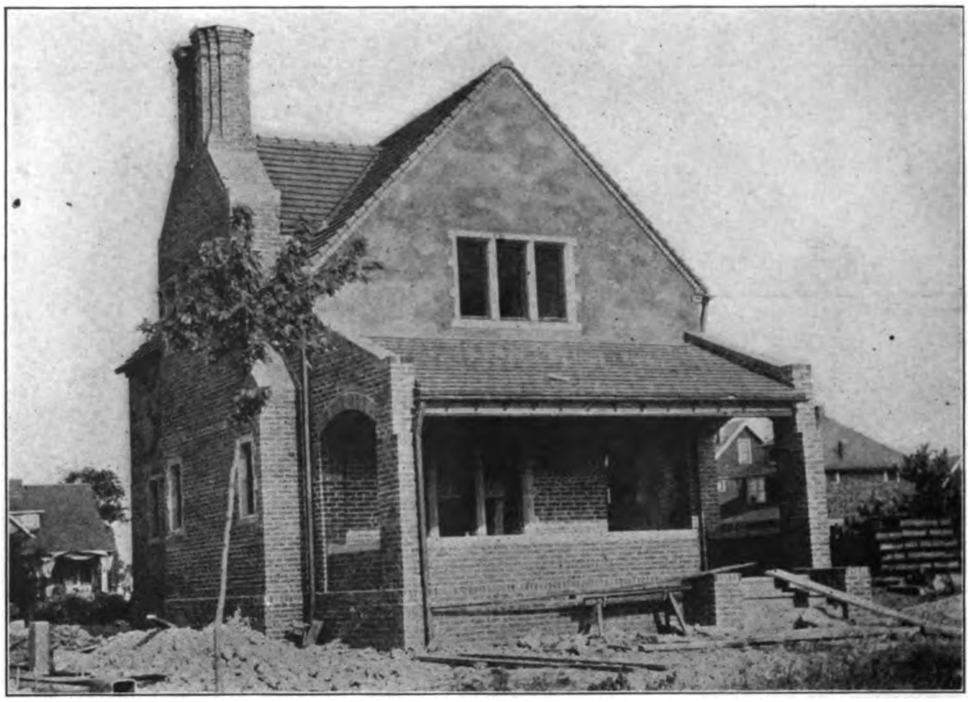


House of hollow tile, faced with brick, with asbestos shingle roof, built by Petrie-Pentland Company. Duplicate of first-prize design in Clay Products Exposition, Chicago, 1913. Cost complete and ready to move into, $4000

small residence involved. For each safe home built in any community is a seed planted in fertile ground and it is certain to grow in the respect that other houses like it will spring up all about it.

The allotment in Cleveland is located on the Lake Shore Boulevard, and about a year ago the S. A. F. E. began the erection there of a small firesafe house to be given away as a prize in connection with an exposition this society was promoting. People owning lots in that section watched the progress of this little brick house with its metal lumber floors, firesafe partitions and its fireproof roof. They asked questions as to the cost and found that this house was costing but little more than frame dwellings of approximately the same size, built in the same allotment. Within a few weeks work was started on a second house of firesafe type, only a stone's throw from the first one. In less than a year, six firesafe houses have been completed, all within sight of the one started by the S. A. F. E. Ground has just been broken for two more. While formerly

FLOORS AND PARTITIONS, particularly the first floor and principal partitions, should be of masonry, in order to check the rapid spread of flames through the interior of the house.



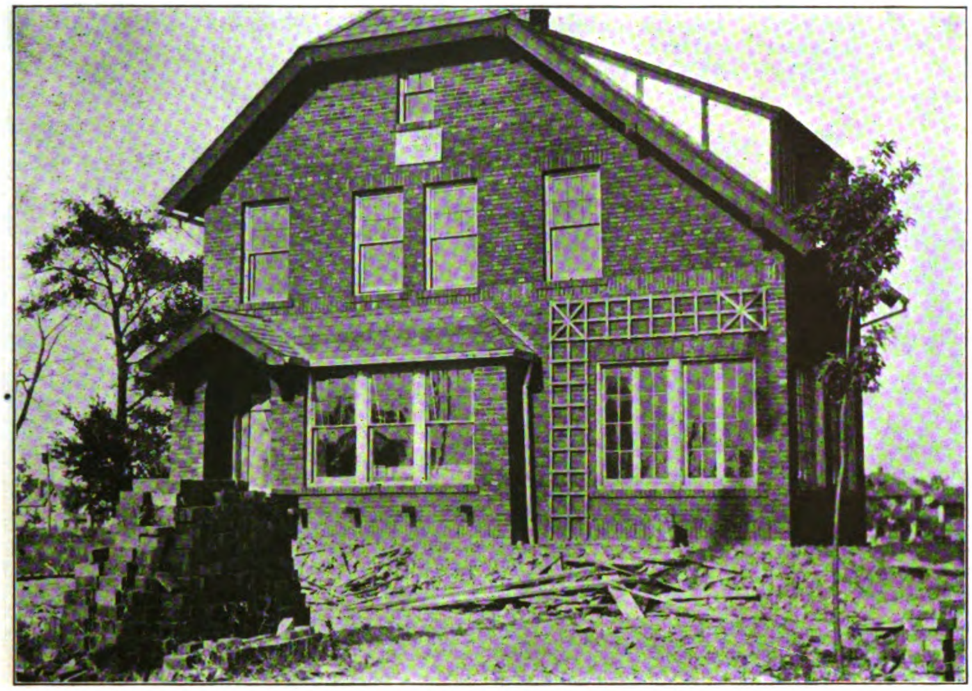
Prize house built and given away by Complete Building Show. Constructed of hollow tile, faced with brick and stucco, with tile roof. Fireproof first floor and partitions. E. A. Ruggles, architect. Cost, $4200

this allotment was being built up with frame, this type of construction has practically been abandoned. These houses are in size very similar to those which were formerly built upon the property in frame construction. They are five, six and seven-room houses, finished in hardwood with hardwood floors, brick mantels, neat decoration throughout. The cost of each house is given in connection with the cut, and this in itself is an object lesson in how a house of firesafe type may be had at a small cost.

There are in Cleveland a half dozen examples of this kind where one builder converted to the firesafe type by the efforts of the S. A. F. E. has resulted in the erection of several good houses in that neighborhood. There is a remarkable example of this kind in the city of Canton. Through the efforts of local brick men the Timpken Allotment began the erection of small brick houses. The result is that every house so far erected on the property is of the firesafe type, and this has had its influence upon other properties in Canton.

In the neighboring city of Massillon there is an enterprising brick manufacturer who, looking for the

THE selection of Fire-safe Roofing ofclay tile, asbestos and cement, slate, asphalt, metal or other fire-retardant or fire-resistive materials is of particular importance in obtaining safety and permanence in the construction of the home.



An artistic home, designed by Architect F. Stillman Fish, for construction of hollow tile, faced with brick. Has enclosed porch and large sleeping balcony. Cost, $5000

closest market for his material, encouraged the erection of brick houses in his home city, with the result that Massillon has become practically a brick city. Very few frame houses have been erected there in recent years.

This is the strongest kind of an argument for the firesafe home, for the reason that these grownig communities of brick or stucco are the result of investigation on the part of home builders. The inferior type of building thrives upon the lack of investigation. If a man proposes to build for himself a home, he should go about his neighborhood and inspect the houses under construction. Let him ask the builders about costs; consider maintenance and up-keep charges on various types of houses; insurance rates and the important depreciation item. It is an important step in a man's career—the building of his house. It deserves investigation.

The average builder has a certain limit that he feels he may spend on his home. He often makes the mis-

INTERIOR PROTECTION is a factor of great importance in the equipment of the home. Standard chemical fire extinguishers should always be at hand, and in homes of the larger type dependable alarm and sprinkler systems should be installed.

A house of modern colonial type. Has six rooms and den and full-height attic for storage. Constructed of tile, faced with brick, and with slate roof it makes an economical and permanent type of home. At $3800 complete it competes in price with wood houses in the neighborhood

take of thinking that the first expenditure is the only expenditure. If $5,000 is his limit and he finds that to have all the room and conveniences that his family demands it will be a tight squeeze to put up a house of even the cheapest material and workmanship, he rarely is willing to sacrifice any of the frills, but nearly always sacrifices quality and burdens himself with a heavy carrying charge to satisfy his taste—or possibly vanity.

If he will say to himself: "I know right now that I will have to paint that frame house every two years as long as I own it, and that each painting will cost me from $100 to $125; three paintings, then, with the necessary repairs meanwhile, will make my investment at the end of six years about $400 above the first cost of the house. The same $400 spent when the house was erected, or assumed as an additional loan for the purpose, would have made my house of brick or stucco, and there never would have been any painting or repairs to make."

No advocate of this cheaper material has yet been able to puncture this argument. Why, then, does not every builder apply this to his own operation?

WEATHER: Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., August, 1916

Priceless

EDUCATING AMERICAN CITIZENS ON FIRESAFE BUILDING

A 12 Months' National Newspaper Publicity Campaign Reaching the People-About-To-Build

The greatest present need of all who are concerned with better building is some adequate means of getting the public to seriously consider the importance of the fire hazard and the fire loss and the proper way to lessen or overcome both.

You and I know the numerous superiorities of modern firesafe construction. But the American people so generally turn to wood for no reason other than the force of precedent, a blind, thoughtless clinging to the traditional strings of custom—a decided *lack of knowledge* regarding the benefits of consistent firesafe building. (All of which is perhaps one reason why the lumbermen call wood the "natural" building medium!)

Your sales manager will tell you that his greatest problems arise from this lack of understanding on the part of the general public. It requires no argument to prove the tremendous volume of business which would result if the average man and woman about to build gave firesafe construction the thought it merits.

If Smith, who plans to give up rented quarters and "own his own home;" if the Widow Jones decides to use her husband's insurance money to buy a home for herself and the children; if the vast army of Bill Browns planning to build a house "for the only girl"—if these and many others really knew *only a little* of the advantages of firesafe building, *it would mean much bigger business for you.*

The National Newspaper Campaign

CONSTRVCTION plans a series of original articles on every phase of the home question, to run about twelve issues. Newspapers in every city in every State, including far off Alaska, Porto Rico and Hawaii, of a population of 50,000 and over, will receive marked copies of the entire series.

"Common Sense Home Building" is the title under which the original feature articles are appearing. Those in June and July were very generally reprinted.

Newspaper editors know that the progressive citizens of every city are interested in safe home construction, furnishing, maintaining, financing, etc. They welcome the right kind of original stories appealing to that strong hope in every ambitious heart—to "own a home."

Serving You Both Ways

There are two ways to serve the cause for better building—to work through the professional factors to the public, so that architects and others who desire conscientiously to serve in the best way the needs of their clients, may advise firesafe construction; and to educate the public to the end that clients, appreciating all the economic, sanitary and other advantages of proper building, will require their architects and engineers to specify safe materials and equipment.

CONSTRVCTION reaches the professional classes, and will continue to reach them; but it will now endeavor to teach the general public—and it is contended that this national-direct-to-consumer - educational-campaign will mean *greater publicity for the firesafe building cause than has ever before been thought of or attempted by any medium of any class.* It is an effort to supply one of the great needs of all concerned if better building is to get the business it merits.

Will You Help Yourself?

The only neutral ground is the graveyard. If we understand the sound logic of co-operation, we take an *active* interest in matters that concern us. If we believe in anything, if our interest and well-intentioned good will is *passive,* then we are actually against its advancement, though we may not know it, because our very inactivity must of necessity hinder and retard the progress which would overwise be made did we do our proper part in giving matters the forward impetus resulting from every individual "boost." Procrastination is worse than the thief of time—it is the dry rot of good intentions. They who are ever thinking of doing something make up a considerable national guard—only they never enlist.

Is it not clearly up to manufacturers to co-operate with this publication in its campaign to tell the public, as well as architects, engineers and other professionals, the

Every Man Who Boosts His Industry Helps His Own Business; Every Man Who Knocks His Competitors Depreciates the Industry of Which Both He and They Are a Part; and Though He May Not Know It, That Man Places a Stumbling Block in His Own Pathway

reasons for our advocacy of better building?

Already several large concerns have offered to run extracts from the series on "Common Sense Homebuilding," to be printed in their house organs, one of which has a monthly circulation of 38,000. Other manufacturers who are acquainted with the editor or owner of local papers, will call on them personally to put in a constructive word for the articles and their educational value to newspaper readers. And there are still other ways in which you can help CONSTRVCTION to help your business.

Your Opinion Sought

Think over this campaign. Manufacturers and CONSTRVCTION are component parts of the trend for better building practice. All are interested in a common goal. Give us your ideas of this plan for worth-while national fireproofing publicity and let us have all possible suggestions and criticisms. No other technical paper ever sought your opinion on such an effort; for, to our knowledge, none ever felt that such work was within their propaganda, and in this they are right.

But CONSTRVCTION'S *purpose is* to promote thought on good fireproofing. This campaign is a constructive effort—a part of its service endeavors.

What do YOU think of this move for "fire prevention preparedness"?

* * *

A darky was endeavoring to make clear to a friend just what constitutes oratory.

"I will elucidate," he said. "If you says black am white, dat am foolish. But if you says black am white an' bellers like a bull, an' pounds de table with both fists, dat am oratory."

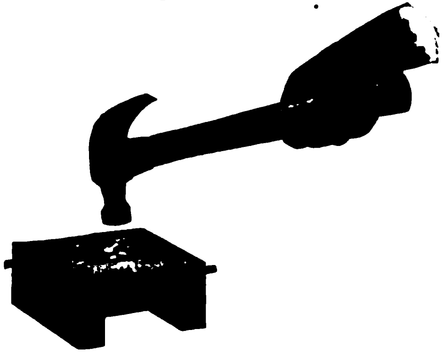
* * *

SEVERE TEST FOR METAL LATH

On May 8 there occurred an explosion of toluol at the laboratories of the Abbott Chemical Company, in Chicago. Toluol is a volatile coal-tar product that, when mixed with air, explodes with great force. In this case the explosion blew out every window on the two upper floors of the building. On one of these floors there was a solid metal-lath and plaster partition, 12 feet 6 inches high and 19 feet long. This partition withstood the force of the explosion without breaking.

REPLACING SIDEWALK AND VAULT LIGHTS

This new construction provides the easy replace feature of broken glass, whereby the original glass, broken by accident or other cause, can be readily knocked out by several good blows from the top, leaving a clean-cut opening or socket in the concrete into which the smaller glass is inserted.



The space between the smaller glass and the wall of the socket is then filled with a fine grout (composed of one part cement and one part sand), which fills the space half way up from the bottom to the top of the glass. The remaining space is then calked with a waterproofing compound of tar, sulphur and zinc.

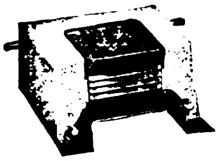
The size of the original glass is 3 inches, either square or round, and the replace glass is 2¾ inches; however, both glass are designed to fit the same opening in form, the latter providing a definite bearing ledge supporting the glass.

While the glass used in the "Raydiant" system is of the highest quality obtainable, yet it is impossible to entirely eliminate cracked and shaled glass, which makes the replace feature an important one.

The "Easy Replace" feature of the "Raydiant Special" system is not confined to the round glass, but may be used with equally good results in the plain square, three-point prism, and deep pendent prism.

An especially appealing point in this construction is the fact that no extra charge is made for this replace feature.

Full particulars and blueprints of the "Raydiant Special" construction may be obtained from the manufacturers: The Berger Mfg. Co., Canton, Ohio.



WHEN YOU CLEAN THE HOUSE

Mrs. Blandenmeere was cleaning house, assisted by the hired girl.

"What shall I do with this mattress, Mrs. Blandenmeere? It seems almost too good to throw away and yet it ain't good enough to use."

"O, stow it away up in the attic somewhere, it might come in handy some time."

"And what about this stuff that's set out here in the corner of the back porch, this box full of excelsior and sack of rags and that bottle of linseed oil?"

"O, put them up in the attic too, I guess.".

And so it goes until the attic from floor to roof is full of boxes of excelsior, old mattresses, old clothes, old rags and paper and all manner of other combustible material. And then some dark day someone comes up into the littered place to find something and lights a match to see by, and then——

Or a spark from a crack in the chimney, or one from the top of someone else's chimney floating in through an open window, does the business when there is no one around to send in the alarm.

When you clean house, clean the attic first. Get rid of all that trash that you are always saving and never use. It is in the way, anyhow, and it is a menace to your home every hour that you allow it to clutter up the attic.

Make your house clean from cellar to attic, *inclusive.—Kansas Fire Marshal Bulletin.*

* * *

The manufacturer who thinks advertising costs too much is perhaps writing the sort of advertising that is not worth using in the space for which he pays.

"PLANNING THE MODERN CITY"

Although there are a number of books on the subject of city planning, most of them are written by architects who emphasize its architectural or aesthetic side, or by students of city government who appear to regard it as an administrative problem.

This volume by Nelson P. Lewis, chief engineer of the Board of Estimate and Apportionment of New York City and member of a number of engineering associations and societies, is just as frankly written with the idea that the fundamental problems of city planning are, and from their very nature must be, engineering problems.

Mr. Lewis discusses subjects that are not generally considered as falling within the scope of the engineer's' activities, but they are all subjects with which one who is responsible for the development of the city plan should be familiar.

Perhaps the most important characteristic of any design should be its adaptability to altered conditions. If this be true with respect to a building, an industrial plant, a railway or a shipping terminal which can be enlarged or replaced or even moved to another location, it is much more important in the case of the ground plan of a city, which cannot be rearranged or transferred to another place.

There is no undertaking, therefore, which demands more careful study of what has happened elsewhere, what is likely to happen in a particular place and the development of tendencies which are sure to result in changes in the methods of living and conducting business, than the working out of the general plan for a city or for successive additions to an existing city.

"The Planning of the Modern City" is a substantial volume, 6 by 9 inches, with 62 figures in the text and 87 full-page plates. There are 423 pages. Cloth binding, $3.50. Published by John Wiley & Sons, New York City.

◆

Push and Publicity will combine to make Prosperity.

Taking a trade, technical or business publication and not reading it, is like sending for the physician and refusing to let him see the patient.

TURNING DUST INTO GOLD

Many industries cause dissatisfaction to people residing in their vicinity on account of the smoke, dust, or odor which they produce. In most cases the methods used to eliminate such objections involve an expense to manufacturers without any benefit to them aside from the removal of the persecution of those annoyed by the conditions causing the pollution of the atmosphere.

Due to the dust given off by their plants, the cement makers of California found they must find a remedy for the damage which was being done in the killing of orange groves. Settling on the leaves, the cement dust insulated them from the air and robbed the vegetation of the nourishment gained from this source.

The cement manufacturers purchased many of the surrounding groves at $1,000 per acre; but as this proved an extremely expensive remedy, efforts were made to collect the dust before it had an opportunity to escape. This dust was then examined and found to contain a high percentage of potash. A method has been devised whereby this potash is extracted from the dust, so that it is now estimated that about one-fourth of the potash supply necessary to meet the demand of this country may be obtained from the dust from cement plants.

Since Germany has been unable to supply the United States with potash, the need of this material has been keenly felt. Agriculture, principally, has suffered in the advance price for potash fertilizers. The cotton crop this season is reported to be one-third of the normal on account of the small suuply of potash. Potash is also required in the manufacture of soap.

This timely discovery makes it possible for the manufacturers of cement to dispose of what has heretofore been regarded as a waste, at a very handsome profit.

◆

Strange, but the best way to rise is to remain on the level.

Try to produce something even when you whittle.

Plain graft is sometimes labeled "financial success."

CARL C. WALTERS IN NEW POSITION

The announcement that Carl C. Walters has discontinued his work as sales maneger for the Hocking Valley Products Company, Columbus, Ohio, manufacturers of face-brick, is a surprise to those related to this industry.

Mr. Walters has been associated with the brick making industry for ten or twelve years and is a well-known figure to the trade. He arrived at his present position of leadership through naught but deserving merit, having arisen from the ranks through his practical experience as a workman and plant superintendent—exceptional training with present-day salesmen.

Originally connected with the Philadelphia, Brazil and St. Louis posts of the Hydraulic-Press Brick Company, with A. B. Meyer & Co. of Indianapolis, and then as sales manager of the Hocking Valley Products Company, where he assumed the responsibilities of his position with the organization of the company, Mr. Walters now goes to East Fultonham, Ohio, to become general manager of the Fultonham Texture Brick Company. He will continue his residence in Zanesville, Ohio, but his work will be done from the office of the company.

◆

Some job—to convince the old-fashioned merchant that advertising is an investment and not an expenditure.

◆

DICKEY FOR SENATORSHIP

Walter S. Dickey, president of the W. S. Dickey Clay Manufacturing Company of Kansas City, Mo., and one of the best-known sewer-pipe and hollow-tile manufacturers of the Middle West, is a candidate for the Republican nomination for United States senator.

◆

Editor—How's the new society reporter? I told him to condense as much as possible.

Assistant—He did. Here's his account of yesterday's afternoon tea: "Mrs. Lovely poured, Mrs. Jabber roared, Mrs. Duller bored, Mrs. Rasping gored, and Mrs. Embonpoint snored."

"NEW MEXICO" FIRST ELECTRICALLY DRIVEN BATTLESHIP

FIRESAFE FURNITURE IN LATEST BATTSESHIP

"Preparedness" and "Progressiveness" seem to be the expressions of the day, and right in that line Uncle Sam is doing at least one thing in his navy that amply expresses both of these sentiments in the building of the battleship "New Mexico." This ship, which is to cost $14,920,000, is the first battleship in the United States, and, so far as known, the first in the world, to be propelled by electricity.

Elaborate experiments have been made by naval engineers with the use of electricity in propelling ships—the most interesting being with the collier "Jupiter," which was built some years ago and which has been rendering a splendid service with the electric propulsion. It was largely as a result of this service that the Navy Department decided to try out this locomotion in a first-class battleship, which is to be among the very largest in our navy. The idea for electrical propulsion has been developed by W. L. R. Emmett, a member of the General Consulting Board of the Navy and a well-known engineer.

The keel for this new giant of the sea was laid in the Brooklyn (N. Y.) navy yard, where it is being built, on October 14, 1915, and it is hoped that the ship will be able to join the Atlantic squadron in the autumn of 1917.

The "New Mexico," which is a duplicate of the battleship "Mississippi," will be followed by the "Tennessee" and "California," both of which are to be equipped with electrical propulsion. At the present time these are the only three ships that will have such equipment. It is assumed that, after they have proven their worth, others will be built along the same lines.

Of necessity the interior equipment of the ship is as modern and up to date as the exterior. It is interesting to note that the government has elected to equip the rooms with up-to-date steel furniture, and this, including desks, chairs, lockers, tables, wardrobes, etc., will be furnished by the Art Metal Construction Company of Jamestown, N. Y.

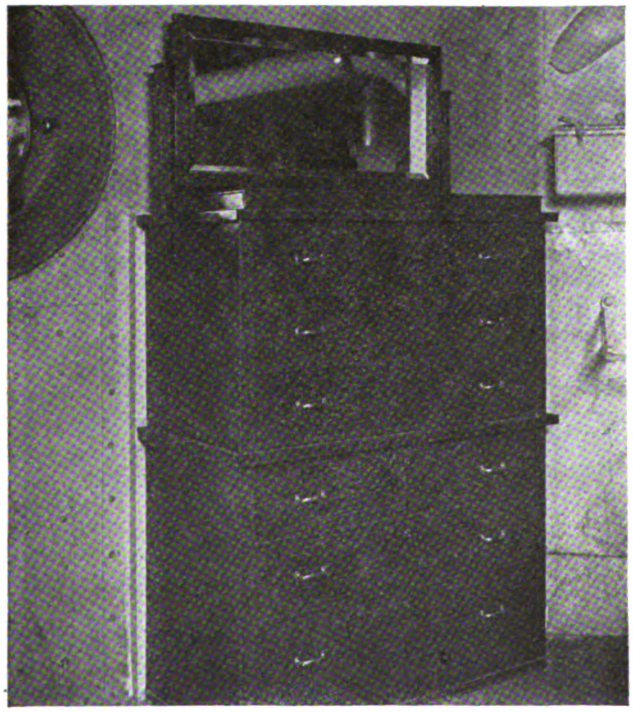
Why Steel Furniture Was Selected

It is a well-known fact among naval officers that most of the casualties happening on board a battleship during action are from splinters. When the ships were ordered to clear for action, at the battle of Santiago, it is said the sailors were obliged to throw overboard all of the wooden tables, chairs, etc., on board, until the bay was so full of floating furniture that a good many stores could have been well stocked for the year. Now, when a ship is ordered to clear for action, there will be no such waste of time nor of material. The steel furniture does not splinter and, therefore, will not have to be thrown overboard prior to a battle.

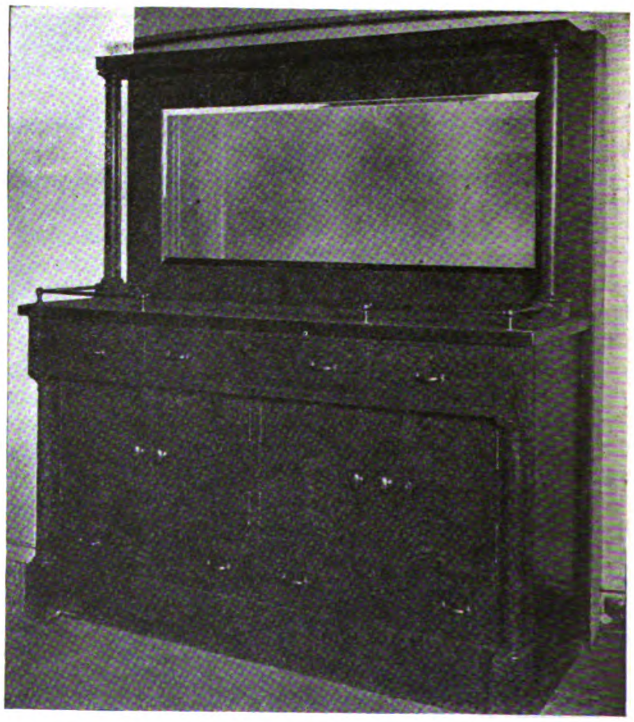
Coming back again to the wonderful equipment of the "New Mexico." She will draw 30 feet of water, the maximum for warships, and will have a normal displacement of 32,000 tons. Her length over all will be 624 feet. It is estimated that her speed on trial will be about 21 knots. The "New Mexico" is to be equipped with nine oil-burning boilers.

There will be some 30,000 horsepower developed by the electrical apparatus that is being especially built for her at one of the largest plants in this country.

Regarding her complement of men: She will carry 1,084 officers and men, of which 75 will be marines. She will also be equipped with twelve 14-inch, 50 caliber breechloading rifles; twenty-two 5-

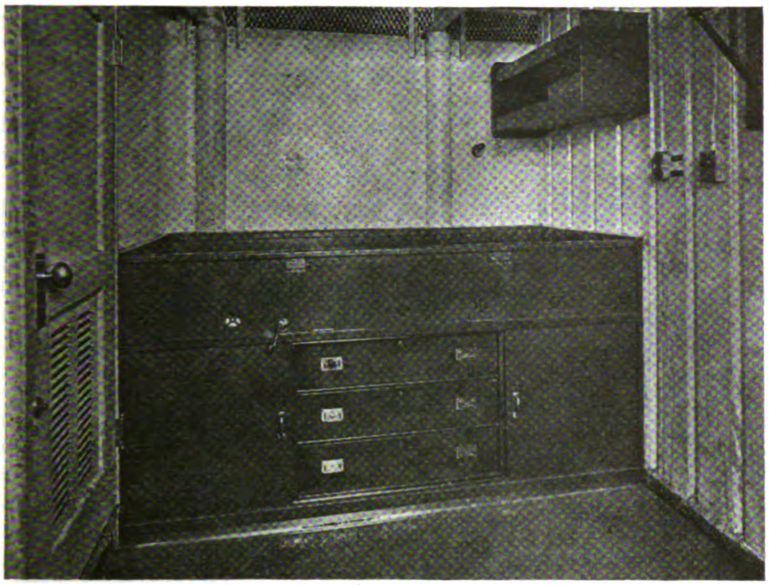


An Art Metal Steel Dresser for officers' quarters on a Dreadnaught. Finished in battleship oak



An Art Metal Steel Sideboard in the dining room of a Dreadnaught. Finished in battleship oak inch caliber rapid-fire guns; four 6-pound saluting guns, and four 21-inch submerged torpedo tubes.

Advertising and Publicity should say to-day that which will make business better to-morrow.



A Single Berth on a Dreadnaught. Note Book Rack at the upper right hand corner. Note the pleasing arrangement of Wardrobe. All built of steel by Art Metal

CEMENT SHIPMENTS INCREASE

Final figures on the Portland Cement industry in 1915, gathered by the United States Geological Survey, confirm the estimate made on January that there was a slight increase in shipments and a slight decrease in production. The shipments of Portland Cement in 1915 were 86,891,681 barrels, valued at $74,756,674 in bulk at the mills; the shipments in 1914 were 86,437,956 barrels, valued at $80,118,475. The finished cement made in 1915 amounted to 85,914,907 barrels, which, compared with the 88,230,170 barrels made in 1914, shows a decrease of more than 2½ per cent.

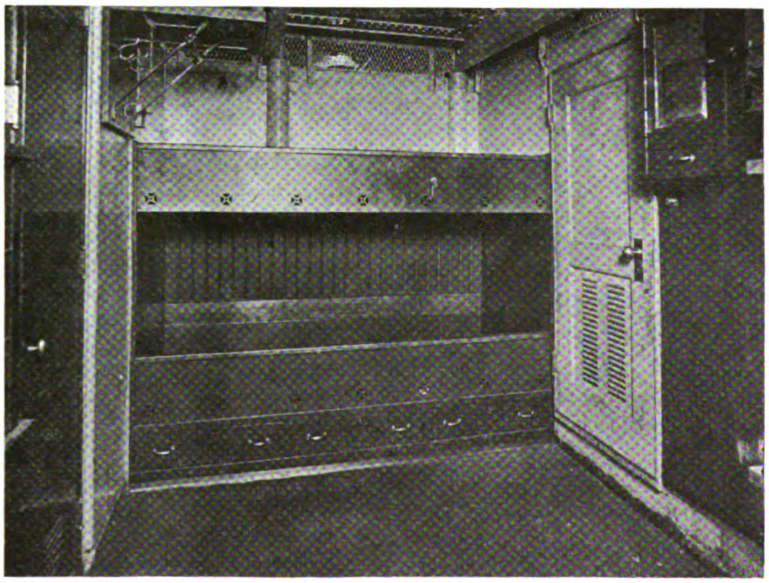
The average factory price per barrel was 86 cents in 1915, compared with 92.7 cents in 1914, a decrease of 6.7 cents, or 7.2 per cent, in average price. According to the Survey's statement, prepared by E. F. Burchard, some of the commercial districts made a larger and some a smaller output in 1914. Slight increases (less than 10 per cent) in output were reported from the Lehigh district and from most of the central districts; decreases were the rule in New York, Indiana, Illinois, and in the Rocky Mountain and Pacific Coast States. Increases of more than 10 per cent were made in the Southeastern States, the largest increase, 20.3 per cent, having been made in the Tennessee - Alabama - Georgia district.

For those who desire the detailed statistics of the Portland Cement industry by districts a tabular summary has been prepared, which may be obtained by application to the Director, U. S. Geological Survey, Washington, D. C.

The shipments of natural cement in 1915 were 750,863 barrels, valued at $358,627, a decrease in quantity of 422 barrels and an increase in value of $7,257 compared with 1914. The average factory price per barrel reported for 1915 was 47.8 cents; the average in 1914 was 46.8 cents. The output in 1915 came from 12 plants—4 in New York, 2 each in Ohio and Minnesota, and 1 each in Pennsylvania, Illinois, Indiana and Kansas.

The shipments of puzzolan cement in 1915 were 42,678 barrels, valued at $39,801, a decrease in quantity of 25,633 barrels and in value of $23,557 compared with the shipments of 1914, both decreases being proportionately rather large. The average factory price per barrel reported for 1915 was 93.3 cents compared with 92.6 cents in 1914. The output in 1915 came from 3 plants—1 each in Alabama, Ohio and Pennsylvania.

You can't make business boom unless it is for a cause that is worth booming.



A Double Berth on a Dreadnaught. Note the Toilet Case in upper right hand side; Dresser and Wardrobe are shown at left. All built of Art Metal Steel

TOWN OF 300 HAS FIRE-SAFE SCHOOL

The greatest battle of all has been going on ever since humankind has existed. It is ceaseless. It is the battle against the forces of ignorance. Every wide-awake man and woman is acquainted with so many matters that could be improved if other minds were not so sealed against enlightenment—plastered tight with the deadening influence of traditions of thoughtless custom—blind, ever unthinking acquiescence to the dumb god-of-things-as-they-are-and-have-been.

When one meets a person of middle age and more and finds the mind plastic, open, eager to hear all things, ever seeking to select and analyse, to eliminate that which is worthless but to seize and utilize that which logic and demonstration show to be valuable, what an inward feeling of exultation arises in both heart and mind! God's blessing on those who travel life's broad highway, determined to keep clear of the ruts! For this old world has too many, the creaking wheels of whose minds each year sink ever deeper into mental ruts. They are the living dead folk.

With these thoughts in mind, how refreshing to note in the town of Brewster, Washington, *with a population of only three hundred people,* there has just been completed a school which is modern in construction methods, and puts to shame many good-sized cities! From the basement to the roof, *every portion of the building is fireproof,* including reinforced concrete stairs and steel window sash. The exterior is all reinforced concrete, as is the interior construction *throughout.*

The Brewster school has four rooms with basement under the entire building. It is equipped with steam heat and modern sanitary plumbing. The total cost of the building was $12,000. The architect of this school was George Keith of Okanogan, Washington, who says: "This shows what a little town of 300 people in the Far West are doing, and, so far as I know, it is the only school in a small town in this State where metal sash have been used." The steel sash were furnished by the Trussed Concrete Steel Company, Youngstown, Ohio, and the interesting story above repeated is culled from *Modern Building.*

Publicity that answers probable questions about desirable things is sufficient reason for itself.

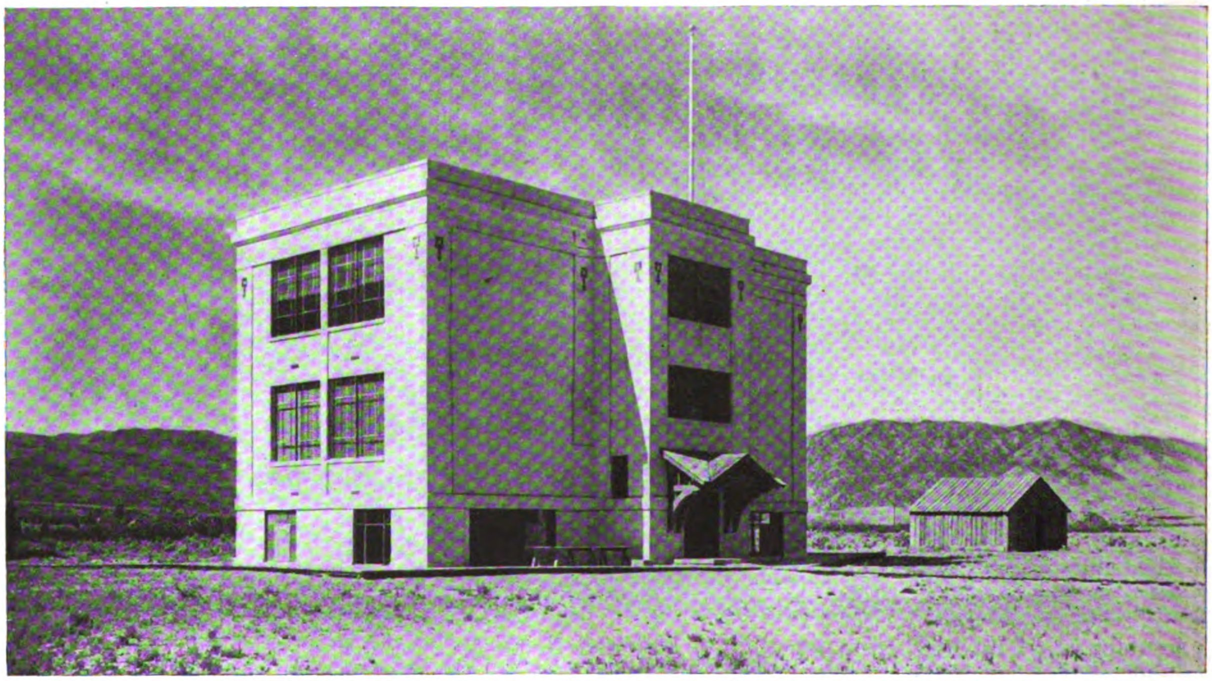
There are anti-vivisectionists who do not hesitate to cut their own friends.

OPINIONS ON OPEN PRICE

The American Face Brick Association requested its membership to express an opinion on the plan advanced in J. Parker B. Fiske's paper on "Price Cutting," which he read before a recent meeting of the executive committee of the association. These comments were asked of dealers as well as manufacturers.

From the many interesting and valuable replies received it is evident that Mr. Fiske's arguments have made a deep impression and stirred considerable thought on the part of those who, now that they have something like a constructive plan before them, or, at any rate, a constructive thought, should get together for the purpose of really trying to apply the remedy for a business which all agree is and has been "very sick."

Many are the suggestions and experiences offered, amongst them being that of one dealer who has tested Mr. Fiske's ideas and gives them his hearty approval, the "open-price" policy having gained business for him. The unprincipled agent receives the odium his practices deserve, one commentator getting to the root of the trouble when he blames not the undesirable agent but the manufacturer who employs him; while the piratical



The Fire-safe School at Brewster, Wash.

BRICK MAKER INSURES EMPLOYES

The following bulletin, issued under date of July 1, by the Chicago Retort and Fire Brick Company of Ottawa, Ill., to its employees in the plant should interest all employers of labor desiring a stronger and more practical bond of loyalty and good-will between themselves and the men who labor for their success. Those who have known the troublesome times occasioned by internal dissatisfaction and strikes may see in this move a worthy means of lessening or eliminating such stumbling blocks to uninterrupted progress.

To Our Employees:

Always having in mind your welfare, and the welfare of those dependent upon you, and your efforts to provide for their future needs, and also realizing the fact that the longer a man is in our employ the better able he should be to carry out his part in the interest of better manufacturing conditions and carefully-made products, we have investigated and devised the plan outlined below:

Beginning July 1, 1916, we will give to each and every man or woman now on our payroll who has been in our employ continuously for a period of thirty days or more a *life insurance policy* in The Travelers Insurance Company of Hartford, Conn., which is one of the strongest and most reliable insurance companies in the United States.

Those who have been in our employ continuously for the period from thirty days to six months will receive an insurance policy for the amount of $250.

Those who have been in our employ continuously for the period from six months to one year will receive an insurance policy for the amount of $350.

Those who have been in our employ continuously for the period from one year to two years will receive an insurance policy for the amount of $500.

Those who have been in our employ continuously for a period of two years and over will receive an insurance policy for $750.

The premium on each policy is paid by the company, but the policy is subject to cancellation should the holder leave the employ of the company except on account of sickness or accident.

No medical or physical examination will be required, it being only necessary for you to fill out and sign an ordinary application blank for this insurance.

An insurance policy, in the form of a certificate of insurance will be issued to you, bearing your name, amount of your insurance and to whom you wish the amount paid in case of your death from any cause whatsoever.

This policy will in no way affect your rights under the compensation law.

We believe every man who is a man is especially desirous at all times to properly provide a means of livelihood for his family in the event of his unexpected death; therefore, you will readily realize the benefits of this voluntary provision to that end as an indication of our material interest in your behalf.

It is our purpose to re-insure you from year to year, and the amount of insurance will be increased each year in accordance with the length of time you continuously have been in our employ, until this maximum amount of $750 is reached. Those having completed six months' continuous employment will receive a new policy, increased from $250 to $350, and so on, according to the schedule outlined above.

We ask your co-operation in proving out the success of this plan.

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broker is thoroughly condemned as a nuisance to the business. Other expressed beliefs are that the dealer should set the price; that the present confusion of prices makes for distrust on the part of consumers, to whom lower prices should be eliminated; that the "open price" should not necessarily interfere with local or special conditions; that the plan will never be a success unless adopted in spirit as well as in fact; one maker selects brother manufacturers as his agents; freight charges should be computed on a definite basis; the product should be standardized; and one writer believes that the Stevens Bill before Congress, providing that a manufacturer may control the sale of his product, should become a law.

ONE DEALER WHO BEAT LUMBER

Dealer advertising has been discussed so long that one wonders if it formed part of the business conversation of those who handled commodities many centuries before the Christian Era. But, usually, that is all it ever amounts to—discussion. Rarely, especially in firesafe building lines, does a dealer "break" from the bondage of custom as practical by his associates and take his own individual stand for advertising.

That E. P. Elzey, a progressive brick dealer and independent-thinker-for-himself, of Parkersburg, W. Va., is deserving of praise will be proven when it is stated that he stormed a lumber-constructed city with strong brick advertising and achieved a success which must make some of the old-timers who don't know and don't "believe in advertising" sit up on their cracker boxes and wonder what in all-smash the world is coming to.

The advertising campaign which Mr. Elsey pushed in presenting the excellences of brick construction might well be studied as a striking example, proving that "it pays to advertise."

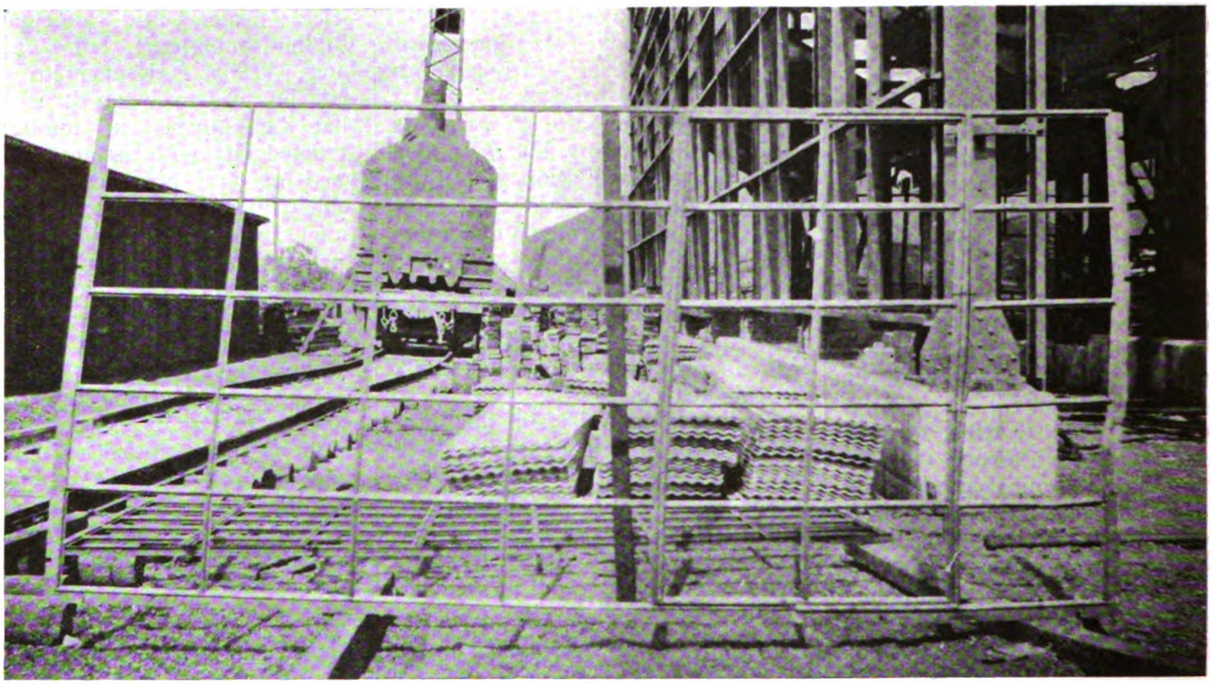
Parkersburg is a wooden city—as yet, it will not long deserve the stigma—but Mr. Elzey is an exception—as are all people who use their own heads; so, believing in the common sense of the average person contemplating building, this energetic citizen went ahead—and succeeded in training the minds of owners and builders to think in terms of firesafe material instead of the long-accepted, unsanitary, unsafe, expensive and flimsy wooden construction. And, from the increased amount of firesafe building at Parkersburg during the past few seasons, it can easily be observed that money spent in educating people to look with favor on better building materials, is not an expense but a wise and profitable *investment.*

Nor did E. P. Elzey run one or two advertisements and then get cold feet because he was not making a million. Not he; this up-to-date brick dealer dug down into his bank-roll and continuously used space in local papers. Now the name of Elzey and the thought of

SEVERE TEST FOR STEEL SASH

When one thinks of a window he pictures a large open space filled with glass—something mighty fragile which would not bear rough handling. We remember back to our boyhood days and recall the most uncanny attraction our favorite baseball had for the neighbor's windows. The finest film seemed like the toughest fabric in comparison to those unresisting windows.

But here is something to give delight to the boys of the coming generations, the lads living in that period when steel sash will be as common, even in dwellings, as the old-fashioned wood sash is to those of the present age. The Trussed Concrete Steel Company has the record of one of their sash that dropped a height of sixty feet, *hitting a steel beam* on the way down. As the illustration shows there is hardly any distortion in this sash, and only a few minutes' work made it as true as the day it left the factory. Of course, there wasn't any glass in the sash, so that the test on the steel was, if anything, more severe.



The sash was dropped during the construction of the Wanamie Breaker of the Lehigh Valley and Wilkesbarre Coal Company. It first fell a distance of twenty feet, striking against a ten-inch steel I-beam, which caused the kink in the bottom of the sash, and then it dropped the remaining forty feet to the ground. At the time the photograph was taken, no attempt had been made regarding repairs except to hammer the flange into place where it struck the beam. Not a joint was opened up in the sash and, except for the slight distortion at the end, where the sash struck the beam, it was not injured in any way.

Needless to say steel sash are not built to withstand treatment of this kind, but the fact that they will bear up under it is remarkable evidence of their extraordinary strength and rigidity. The results demonstrate the exceptional resistance and permanence given to window openings by the use of steel sash and their ability to withstand exceptionally severe tests and exposure.

INDUSTRIAL SINS OF OMISSION

Of interest to every manufacturer is the following article on the value of learning the facts, of being sure you are right before going ahead, taken from *American Industries.*

Misunderstanding is the cause of a good portion of the disputes between all men all over the world.

Next to this evil ranks the common sin of accepting as Bible truth some gossip picked up on the street, in the shop or in the home. One of the most violent strikes which has taken place in this country in recent years has been found to be due directly to the fact that employees accepted a will-o'-the-wisp report that their employers had realized 45 per cent dividends on their stock holdings. The truth of the matter, which was shown to be available to any man in the plant who wanted to see a correctly audited and sworn statement of accounts, was that the corporation earned and distributed a 7 per cent dividend for a single

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brick have become something of an institution in Parkersburg.

Those who are contemplating a similar campaign would do well to take a suggestion from the experience of this dealer; for what he has done is the result not of unusual brilliancy but of faith in the product he sells and the initiative to "boost" that material *continuously*. His success can be duplicated by hundred of dealers all over America. Remember, too, that he is in a frame city and that his fight for brick was no easily-won battle. Go to your local newspaper and sign up for a year's advertising. Hammer the thought of better building in such a way that every one who reads the local paper *must* in time grow to think of building construction in terms of firesafety.

year, after failing to pay dividends of over 2½ per cent for the two preceding years and passing dividends for three years prior thereto.

No effort was made by the employees who struck when their wage demands were not promptly decided and granted to verify the accuracy or authenticity of the source of the 45 per cent dividend report. The rumor, however, was later admitted to have been the principal motive actuating the demand for a 10 per cent increase in wage rates. But considerable violence had been indulged in by the misled strikers and material damage to the plant and surrounding property inflicted before the dispute began to unfold itself in arbitration conferences.

Ten of the principal figures in the strike subsequently had private extemporaneous conversations with the head of the concern, the employees of which had previously believed they had every right and reason to ask and expect an increase in wages as their share of the reported 45 per cent melon for stockholders. After the plain, unvarnished facts about the results of the company's operations, both the previous year and years prior thereto, had been discovered, every one of these ten laboring men confessed that they had acted on the "common report on the street," and readily admitted that had they know the real facts the strike would never have taken place.

Such are the sins of omission which exist in many branches of industrial production, with relation to the lack of co-operation and get-together spirit between employers and employees. The fault is generally on both sides, although in the case cited the employers were never given an opportunity to tell the facts as they were before the strike was on. In most instances, however, where such misunderstanding exists, the employer who does not see to it that his employees are as fully and truly in touch with results of their combined productive efforts is open to the same form of criticism as the employees who go on stike with unauthenticated information as the basis for the bill of rights they are fighting.

* * *

It takes more nerve for a woman to open a telegram than it does for a man to open a jackpot.

PRACTICAL BRICK HOME ADVERTISING

As an example of practical reply to the common though untrue idea that a firesafe home costs much more than one of wood, the Decatur Brick Manufacturing Company of Decatur, Ill., realizing this public attitude, has taken advantage of local conditions, which may be observed all over the country, in sending out an attractive illustrated pamphlet on brick construction as compared with frame, in which it has illustrated a number of new, beautiful and modern brick homes, giving comparative figures of cost in such a practical way as to make for interesting and instructive data.

The pictures used are of brick homes at Decatur and nearby cities, each one a standing argument backing up the claims of the pamphlet. Such logical publicity cannot fail to swing local business toward the progressive manufacturer who uses such sound illustrations in favor of the firesafe product he supplies.

* * *

The Sunday school teacher was talking to her pupils on patience. She explained her topic carefully, and as an aid to the understanding she gave each pupil a card bearing the picture of a boy fishing.

"Even pleasure," she said, "requires the exercise of patience. See the boy fishing; he must sit and wait and wait. He must be patient." Having treated the subject very fully, she began with the simplest, most practical question.

"And now, can any little boy tell me what we need most when we go fishing?"

The answer was quickly shouted with one voice: "Bait!"

* * *

PROFESSOR BINNS HONORED

The "special honor" in pottery has been awarded to Professor Charles F. Binns, director of the New York State School of Clayworking and Ceramics at Alfred, New York, for his collection of stone-ware vases exhibited at Washington, D. C., at the Industrial Art Exhibition on the Federation of Arts. For many years Professor Binns has been engaged in developing these wares, although the fifteen pieces placed on exhibition are nearly all new.

HYDRATED LIME

Of the materials advocated to be added to concrete none have met with more general favor among engineers, architects and contractors than hydrated lime.

As a material for making concrete watertight, the effectiveness and economy of hydrated lime are known, but a few statements regarding its other values may be of interest. More or less hydrated lime is used by the building fraternity to make cement mortar work more easily under the trowel. This permits mechanics to make better bearing surfaces for the bricks, resulting in a better job of masonry. This same principle of easy working material brought about by hydrated lime also applies to concrete.

By adding ten pounds (one eight-quart pailful) of hydrated lime to each bag of cement used in a batch the concrete mass will be found to be more plastic, it will work more easily in the forms, in which it will compact closely. The natural result is uniform, dense, watertight concrete having smooth, even surfaces without honeycombing.

In spouting concrete, hydrated lime is especially valuable. When the concrete does not flow freely down the spouts, the most natural thing for a concreting gang to do is to add water to make it flow. The U. S. Bureau of Standards has found that this excess water very markedly reduces the strength and quality of the concrete (see Technologic Paper No. 58, U. S. Bureau of Standards, June, 1916) by causing the cement and sand to become washed away from the stone or gravel. In the forms the cement, sand and water form a "soupy" mixture and the stone passes through and settles at the bottom. The result is a stratified concrete, containing honeycombing, which does not have the strength of well-made concrete.

With a small amount of hydrated lime in the concrete, it is plastic and slippery, and slides down the spouts with the normal amount of mixing water. With the cause for the excess water removed by the use of hydrated lime, the danger of non-uniform, stratified concrete is removed.

Many engineers are now specify-

TEACHERS LEARN ABOUT CONCRETE

About 200 young men and women, manual training teachers, recently gathered in Chicago from all parts of the United States at the first meeting for the Short Course in Concrete for Manual Training and Vocational Teachers. Also amongst those present were advanced educators, well-known manufacturers, experienced engineers, and a sculptor of international reputation.

The course was held at the Lewis Institute under the direction of the Extension Division of the Portland Cement Association. Interest and attendance were beyond expectations, and there is every reason to believe that this event marks the beginning of greatly increased interest in the work which the short course is intended to promote.

At the close of the meeting an informal dinner was given at the Sherman Hotel to teachers and others in attendance. Addresses were delivered by H. E. Miles, president of the State Industrial Educational Bureau of Wisconsin, and Lorado Taft, the sculptor. Mr. Miles urged a broad training of the hand to do practical things, while Mr. Taft gave a hint of the architectural beauties which are to come through the adaptation of concrete.

AGAINST UNFAIR FOREIGN COMPETITION

Manufacturers should be much interested in the "General Revenue Bill," just reported to the House of Representatives by the Ways and Means Committee. Besides carrying special taxes and dyestuff legislation, the bill calls for an alleged "non-partisan" tariff commission, as well as a clause on "unfair competition," to work against the "dumping" of foreign goods into this country after the war. The House passed the Bill July 10.

Following is the committee's report on "unfair competition:"

"In order that persons, partnerships, corporations and associations in foreign countries, whose goods are sold in this country, may be placed in the same position as our manufacturers with reference to unfair competition, your committee recommends:

"1. The adoption of a provision making it unlawful for a person, partnership, corporation, or association to import and systematically sell any article at a price substantially less than the actual market value or wholesale price of such article at the time of exportation, with the intent of destroying or injurying an industry in the United States, or of preventing the establishment of an industry in the United States, or of restraining or monopolizing any part of trade and commerce in such articles in the United States; and

"2. The levying of a special and additional duty equal to double the amount of such duty upon any article produced in a foreign country and imported into this country under any agreement, understanding or condition that the importer thereof or any other person in the United States shall be restricted in any manner in his using, purchasing, or dealing in the articles of another person, partnership, corporation or association."

GOOD ASSOCIATION WORK FOR BRICK

Increased interest in brick in the Northwest is due in no small measure to the excellent work undertaken by the Northwestern Clay Association and the prizes which it has granted for designs for brick dwelling houses. This contest, which was conducted by the Minnesota State Art Commission, is the fourth competition of its kind handled by this commission.

Following is a list of the successful candidates for design prizes: Edward Goralsky, 715 Capitol Bank Building, St. Paul, won the first prize of $200; R. Harrison Haslund, 2417 Clinton avenue, Minneapolis, won second prize; and the third and fourth prizes, of $125 and $50, were won on two drawings entered by one person, Oscar T. Long, 3553 North Upton avenue, Minneapolis; the fifth prize, of $50, went to G. E. Wiley and Rudolph Zelzer, 715 Capitol Bank Building, St. Paul. Newton L. Lockwood, 509 Essex Building, Minneapolis, received first honorable mention; second honorable mention went to Emil H. Lund, 1100 Donaldson Building, Minneapolis; Lawrence A. Fournier, 3505 North Sheridan avenue, Minneapolis, received third honorable mention.

The following well-known persons constituted the jury: William H. Schuchardt, chairman, Milwaukee; Miss Josephine Berry, professor of home economics, University of Minnesota; B. W. Day, architect, St. Paul; A. C. Ochs, manufacturer of brick, Springfield, Minn.; Maurice Schumacher, general contractor, Minneapolis.

Plans to be Published

These successful plans will be published by the State Art Commission, to be sold at the cost of making the blue prints, the idea being to give to the home builder of average means really meritorious and attractive architectural service. The plan has demonstrated its feasibility in the previous competitions, the result being that more dwelling house plans have been placed in the hands of modest home builders than has ever been the case before. Requests for the plans have come from all parts of the continent; many of them going to home aspirants across the sea. What has been the case with designs for combustible homes will, beyond doubt, be done in greater measure with the brick drawings, since they offer attractive designs in firesafe material. Furthermore, these designs are a most serviceable and practical answer to the common objection regarding the supposedly great cost of firesafe home building.

"What's up, Bill? You look scared."

"Should think so. Been a big explosion at our 'ouse."

"Much damage?"

"Damage! Why, my father and mother were blown right out of the window. The neighbors, they say that its the first time they've been seen to leave the house together for fifteen years.

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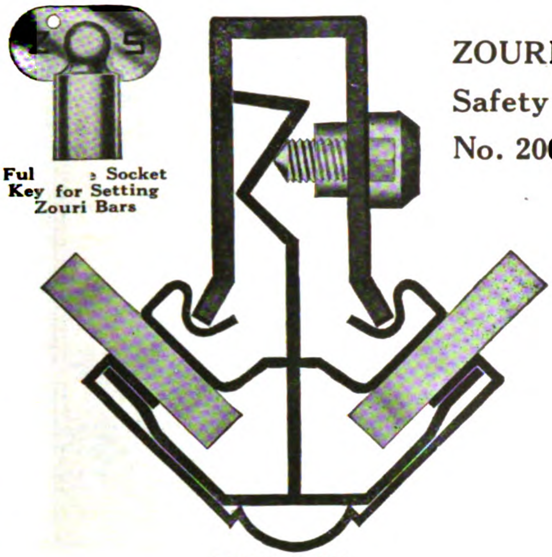
ing hydrated lime in all of their concrete work, and many contractors are using it of their own volition.

These are all demonstrated actions and should interest engineers, architects and contractors to the possibilities which hydrated lime offers.

ZOURI

Safety Store Front Construction



Full Size Socket Key for Setting Zouri Bars

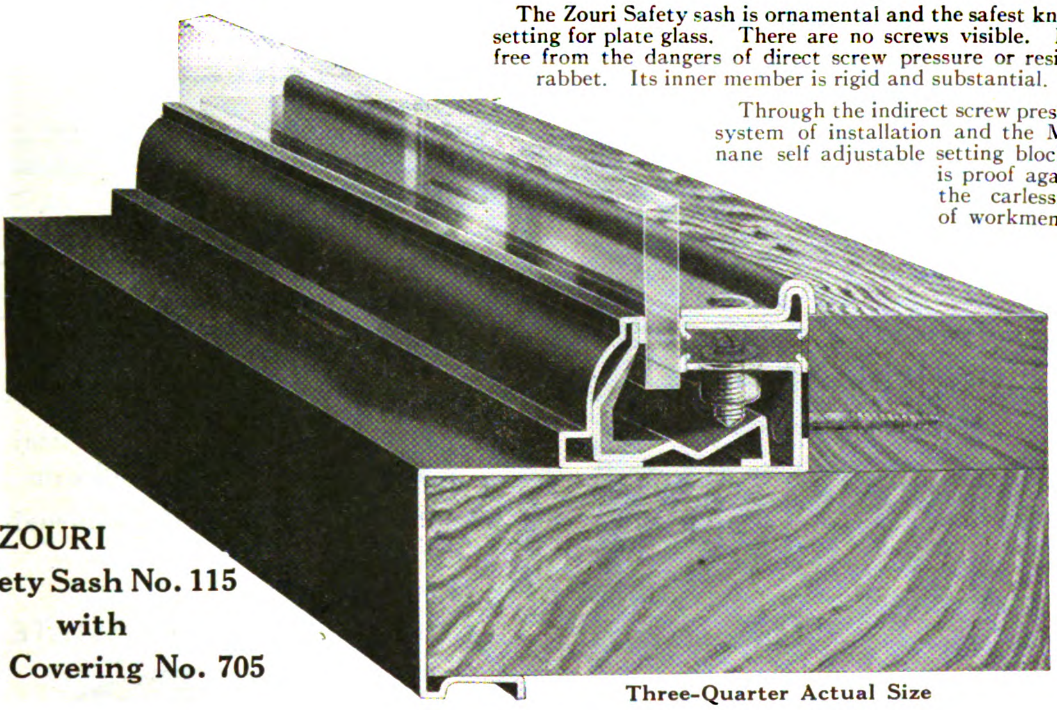
FULL SIZE

ZOURI
Safety **Key-Set Corner Bar**
No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carlessness of workmen.



ZOURI
Safety Sash No. 115
with
Sill Covering No. 705

Three-Quarter Actual Size

DETAILS MAILED ON APPLICATION

Zouri Drawn Metals Company

1813-1833 East End Avenue Chicago Heights, Illinois

Operating under Murnane and Marr Patents

AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

One-half of a Brick is Service

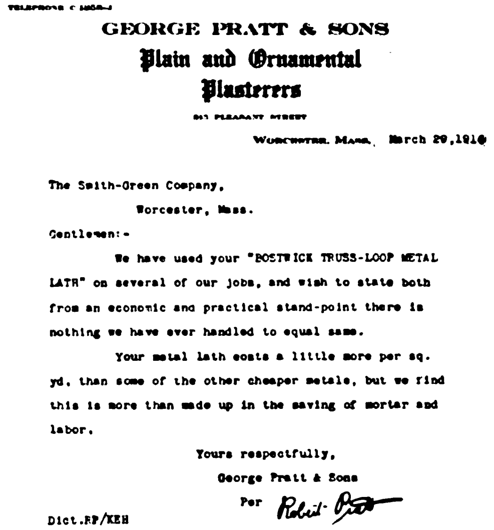
You not only need brick for your Building Operation but you must have them when you want them.
We have anticipated the demands of a growing city.
Every year we increase our output and our service equipment.
We are now prepared for 1916 BUSINESS.

The Farr Brick Co.

Leader-News Bldg., Cleveland

"BOSTWICK TRUSS-LOOP" METAL LATH

is not only fire resistant but, but also economical. See what a practical man says—



GEORGE PRATT & SONS
Plain and Ornamental
Plasterers
[illegible] PLEASANT STREET

Worcester, Mass., March 29,1916

The Smith-Green Company,
Worcester, Mass.

Gentlemen:-

We have used your "BOSTWICK TRUSS-LOOP METAL LATH" on several of our jobs, and wish to state both from an economic and practical stand-point there is nothing we have ever handled to equal same.

Your metal lath costs a little more per sq. yd. than some of the other cheaper metals, but we find this is more than made up in the saving of mortar and labor.

Yours respectfully,
George Pratt & Sons
Per Robert Pratt

Dict.RP/KEH

THE BOSTWICK STEEL LATH CO.,
NILES, OHIO

REYNOLDS

FIRE SAFE

APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK
H.M.R.
ESTABLISHED 1868

SHINGLES

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

If your dealer cannot supply you write the factory.

CLASS E

H. M. Reynolds Asphalt Shingle Co.
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

Your Home is Known by the Company it Keeps

The selection of a site is all important.

When you buy, rent or sell real estate of any kind our services will help.

Our three offices offer unusual facilities to every client.

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THE ONELLY CO.

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Ground Floor, Williamson Building
CLEVELAND, OHIO

BRANCHES:
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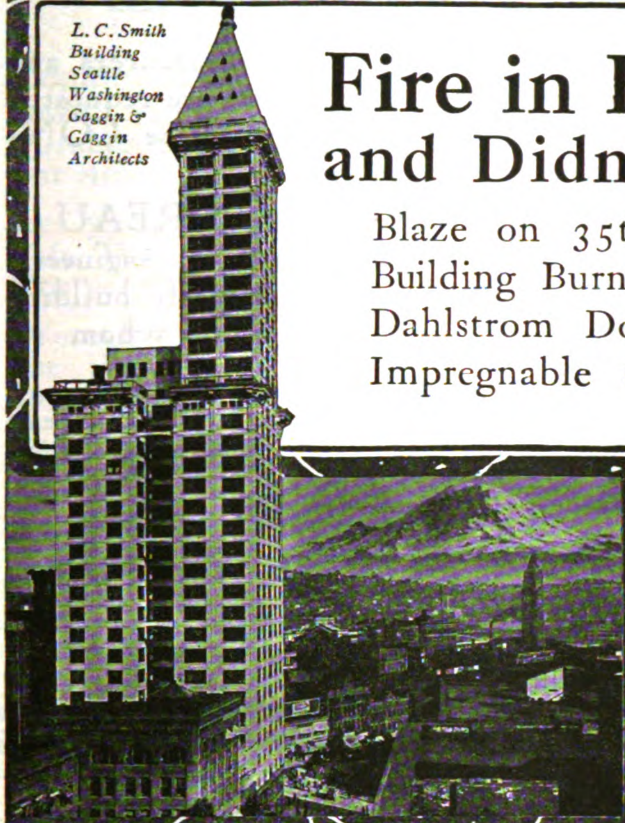
Lakewood, Corner Belle & Detroit Ave.



Fire in Pipe Shaft and Didn't Know It

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.

Door Finish Only Damage
Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.

The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.

Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire.

Your responsibility ends with the installation.

Write for all the facts.

DAHLSTROM PATENT DOOR ARTISTIC EVERLASTING SANITARY AND FIREPROOF

THE DAHLSTROM METALLIC DOOR CO.

Executive Office and Plant, 61 Blackstone Ave., Jamestown, N. Y.

New York Office, 130 East 15th Street

Fireproofing Information Bureau

¶ In establishing this complete reference service, manufacturers and others producing catalogs, house organs, price lists, etc., are requested to forward their printed matter and samples and place CONSTRVCTION on their permanent mailing lists.

¶ The FIREPROOFING INFORMATION BUREAU is intended for the use of resident and visiting architects, engineers, contractors and the general business and professional firesafe building fraternity, as well as prospective building owners, to whom its use will be extended gratuitously.

¶ Every effort will be made to develop and maintain this Bureau to a high point of efficiency.

¶ Prompt coöperation is solicited.

"CONSTRVCTION" TIMES BUILDING New York City

STUCCO HOUSES
Cost Less Than Frame

Would you like to know how to build a **Stucco** house at less cost than frame?

Would you like to know how to save **33⅓** per cent in cost of the wall construction and get a fire-safe, more attractive, more durable house?

Then write to us today for full information, booklets and cost data on Stucco houses.

Let us prove our claim to you.

The Cleveland Builders Supply Co.
Cleveland, Ohio

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BARKWILL BRICK CO.

BRICK and TILE

MADE RIGHT
SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

THE LAKEWOOD MASON SUPPLY CO.
DEALERS IN
BUILDERS SUPPLIES
and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const. Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

OFFICES AND WAREHOUSE:
HIRD AND NICKEL PLATE
LAKEWOOD, O.

Do Not Delay Building

Conditions for building never will be more favorable than at the present time.

Let your dream of that Safe Home be realized this year.

We sell every material for the Fire Resistive Building.

Service the best.

Cuyahoga Builders' Supply Company

SCHOFIELD BUILDING
CLEVELAND, OHIO

for

Converts to Cooperation

Analyze this and the past numbers of Constrvction

Then ask yourself if you ever heard of anyone doing such real service for the fireproofing cause. It is our conception of vital boosting—this jumping right into legislative battles and fighting for ordinances favoring the use of fireproof material in building construction.

CONSTRVCTION is the only publication wholly devoted to consistent fireproofing—it is actively fighting for its constituents—it wants to be measured by the value of the good it accomplishes for your product.

Subscribe for CONSTRVCTION
Get Your Associates to Do Likewise

Help Us to Help You

RARITAN HOLLOW TILE

FOR FIREPROOF HOUSES

FLOOR ARCHES AND ROOF BLOCKS

RARITAN

PARTITIONS AND WALL BLOCKS

Telephone: Murray Hill 7788-7789

RARITAN CLAY PRODUCTS COMPANY
OF NEW YORK
220 East 138th Street

"What Fools these Mortals Be"

An honest business family, consisting of manufacturers, jobbers and retailers, is driving through the forest of distribution to the market place. The woods are beset with hungry wolves, and the only safe route is along the well-marked road of intelligent advertising. The driver is a safe and experienced Advertising director and the members of the party are armed with cash resources, ability and experience, with which they may fight their common enemy, the wolves. They are all anxious to obtain the profits awaiting them at the market place and they show some impatience at the time the journey requires. Finally there is a dispute as to a shorter course to be followed. The manufacturer, the jobber, the retailer and the consumer, each insists on dictating the way. Suddenly they seize the reins and the frightened horses plunge off the established road. Then the men attack each other, each striving to control. Their weapons are turned against each other and immediately their common enemies, Fraudulent Advertising, Dishonest Merchandising, and Unfair Competition come closer to the sleigh. The wolves realize that their victims are being prepared for them. Their jaws snap eagerly in anticipation of the feast. It is evident that the entire party is doomed if the family conflict continues. One by one the members will be dragged down by the wolves. Their fate is inevitable—but harken! Hear those shouts at a distance! Another party is approaching at top speed! There is yet hope, for it is the Vigilance Patrol maintained by The Associated Advertising Clubs of the World. Business will be rescued! The guns of the truth-in-advertising forces will be turned on the marauders and the family will be conducted to the safety of public confidence.

This is one of a series to Advertise Advertising—by the Associated Advertising Clubs of the World (headquarters Indianapolis). The illustration is used through the courtesy of the publishers of "Puck" The text was prepared by Merle Sidener, chairman of the National Vigilance Committee of the Associated Advertising Clubs. Write for booklet, written for buyers like yourself. Every man or woman who buys any kind of commodities will find it profitable reading.

ASSOCIATED ADVERTISING CLUBS OF THE WORLD
TRUTH

Serves more people in more ways than any other Institution of its kind in the world.

JOHNS-MANVILLE SERVICE

COVERS THE CONTINENT

J-M Asbestos Roofings

prove the service they will give you by the service they have given others

J-M Asbestos Roofs have been in use on many manufacturing and industrial plants from twenty to thirty years without a cent for upkeep.

They are still in excellent condition and are good for many more years of water-proof, fire-resistive roofing service.

Johns-Manville ASBESTOS

"The Registered Roofing"

As these roofs are made only of Asbestos and Lake Trinidad Asphalt they do not break down, but are practically permanent. They never need coating or painting or any other attention, so that their first cost is their only cost.

J-M Asbestos Roofings are made in several different forms. One of these is best suited to your requirements. Our engineers will be glad to advise you upon receipt of a statement of your needs.

J-M Asbestos Roofinings are furnished in two forms; built up when a monolithic roof is required, and ready for roll form.

J-M Asbestos Roofings are examined, approved, classified and labelled by the Underwriters' Laboratories, Inc.

H. W. Johns-Manville Co.

Executive Offices, 296 Madison Ave., New York

Boston
Chicago
Cleveland
New York
Philadelphia
Pittsburgh
Toronto
St. Louis
San Francisco
Seattle

POMEROY FIRE RETARDANT WINDOWS

Not Made to Meet a Price, but to Set a Standard of Service

THE window as a fuel economizer—pages could be written on that subject—its importance justifies it—but space forbids here more than a mere statement of some facts. You can save your client a little money by permitting the use of cheap, "leaky" fire windows—but you will burden him with an extravagant fuel bill, year after year. Or—you can specify good, substantial, weather-tight (and at the same time, easily operated) windows at a slightly higher first cost—and save that price difference many times over in the fuel saving the first winter. Which shows the better judgment? **Pomeroy** Windows are fuel economizers.

Ask Us To Show How and Why

SAMPLES FILED WITH ARCHITECTS SAMPLES CO NEW YORK CITY

S. H. POMEROY COMPANY, INC.

30 EAST 42ND STREET NEW YORK

First National Bank Building, Omaha, Neb.
Graham, Burnham & Co., Chicago, Architects
Lanquist & Illsley Co., Chicago, Contractors

NATCO HOLLOW·TILE

Another chapter in the big book of skyscrapers that never could have been written without Natco. This modern material means strength with lightness, reduction of structural steel requirements, economy, rapid erection—and most important of all, absolute protection against fire.

270,000 square feet of Natco arches, partitions, furring and column covering furnished and erected in the big fifteen story First National Bank Building, Omaha, Nebraska, by

NATIONAL·FIRE·PROOFING ·COMPANY·
388 FEDERAL STREET, PITTSBURGH, PA.
Other Offices:
New York, Chicago, Boston, Philadelphia, Washington, Syracuse, Detroit
23 Factories in the United States and also at Hamilton, Ontario, Canada

THE MATERIAL THAT MADE THE SKYSCRAPER POSSIBLE

OFFICIAL JOURNAL OF SOCIETY ADVOCATING FIRE ELIMINATION

CONSTRVCTION

WITH A
DEPARTMENT DEVOTED TO

SAFE HOMES

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A Novel Home of Brick.
A Stucco Cottage.
A Simple Home.
An English Home Design.
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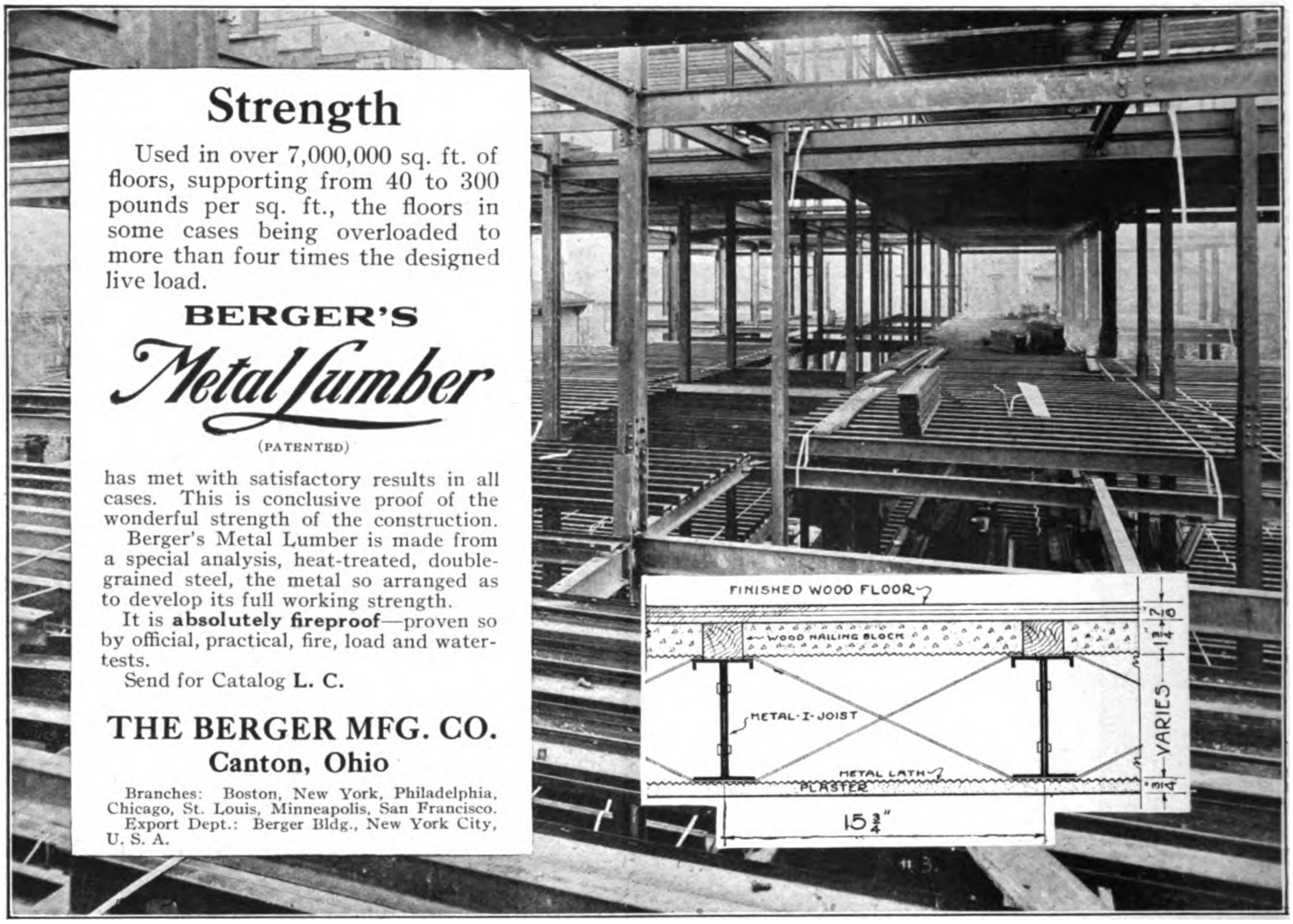
Entered as second-class matter November 8, 1915, at the post office at New York, New York, under the Act of March 3, 1879.

SUBSCRIPTION PRICE—TWO DOLLARS THE YEAR IN U. S. A.


FINISHED WOOD FLOOR
WOOD NAILING BLOCK
METAL-I-JOIST
METAL LATH
PLASTER
15 3/4"
7/8
1 3/4
VARIES
3/4

Strength

Used in over 7,000,000 sq. ft. of floors, supporting from 40 to 300 pounds per sq. ft., the floors in some cases being overloaded to more than four times the designed live load.

BERGER'S

Metal Lumber

(PATENTED)

has met with satisfactory results in all cases. This is conclusive proof of the wonderful strength of the construction.

Berger's Metal Lumber is made from a special analysis, heat-treated, double-grained steel, the metal so arranged as to develop its full working strength.

It is **absolutely fireproof**—proven so by official, practical, fire, load and water-tests.

Send for Catalog **L. C.**

THE BERGER MFG. CO.
Canton, Ohio

Branches: Boston, New York, Philadelphia, Chicago, St. Louis, Minneapolis, San Francisco.
Export Dept.: Berger Bldg., New York City, U. S. A.

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HOLLOW TILE

FOR FIREPROOF HOUSES

FLOOR ARCHES
AND
ROOF BLOCKS

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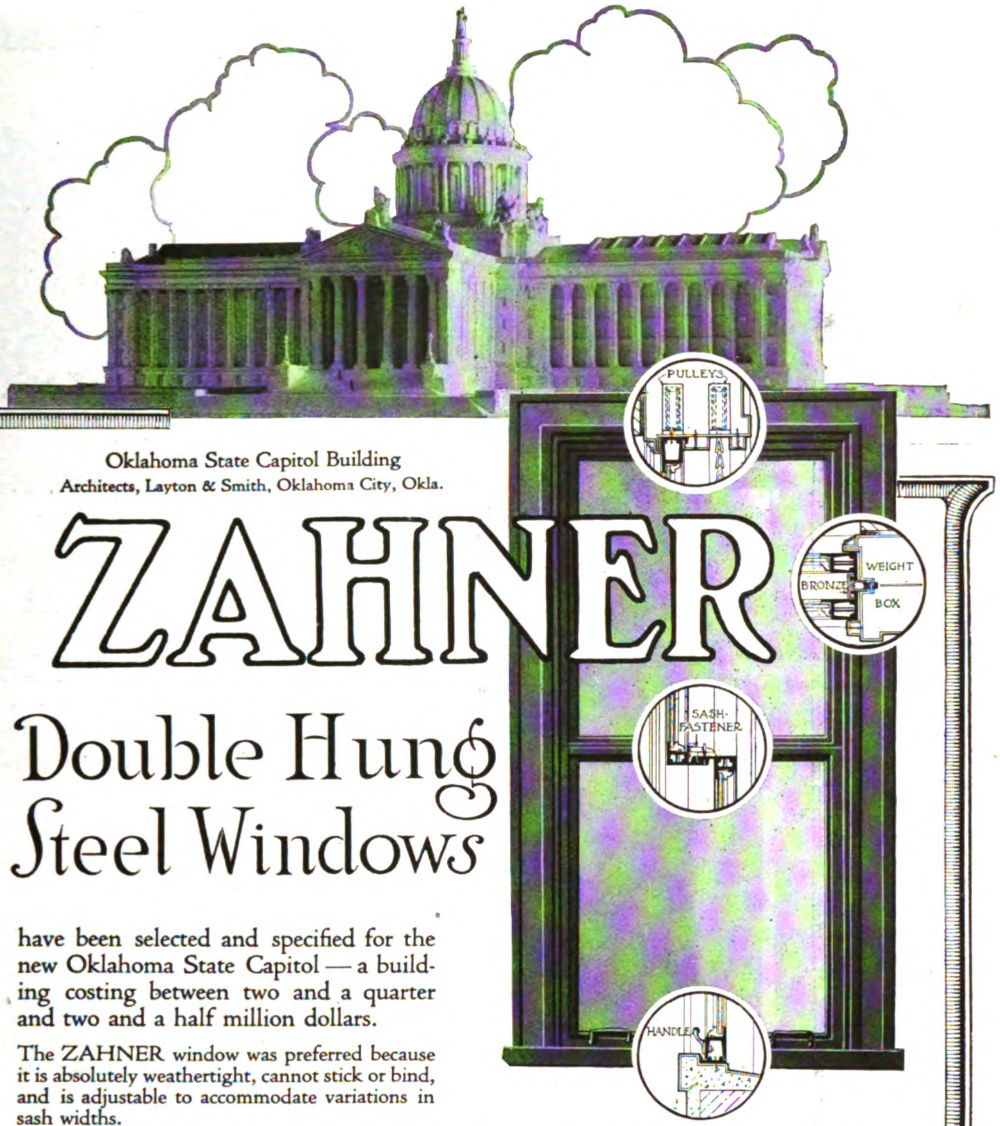


Oklahoma State Capitol Building
Architects, Layton & Smith, Oklahoma City, Okla.

ZAHNER

Double Hung Steel Windows

have been selected and specified for the new Oklahoma State Capitol — a building costing between two and a quarter and two and a half million dollars.

The ZAHNER window was preferred because it is absolutely weathertight, cannot stick or bind, and is adjustable to accommodate variations in sash widths.

You ought to know all about this new window, but we cannot tell you here — lack of space forbids.

Send us a post card, however, and we'll send you blue prints and full information.

1 Section at head showing weatherproof double contact.
2 Section of meeting rail showing straight line construction and continuous weatherproof double contact.
3 Section showing non-binding feature, adjustable bronze contact strip and double weathering.
4 Section at sill showing weatherproof double contact.

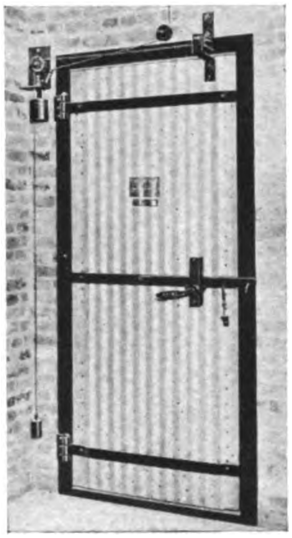
THE ZAHNER METAL SASH AND DOOR CO.

CANTON

Agents in all Principal Cities

New York Office: 42d Street Building

Z M S & D Co.
ZAHNER QUALITY



(*Patented*)

Saino All-Metal Fire Doors and Shutters

Light, Rigid, Indestructible! Built for daily use. No wood to rot; no tin to rust; no repairs. Seventeen years without a replacement from fire, rust or rot.

SAINO FIRE DOOR AND SHUTTER CO.
BROOKLYN, 186 Diamond St. CHICAGO, 2025 Elston Ave.
MEMPHIS, TENN.

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

Kno-Burn

TRADE MARK

Expanded Metal Lath

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

North Western Expanded Metal Co.
Manufacturers of all types
of Expanded Metal
958 Old Colony Bldg., Chicago, Ill.

"The Largest Fire Insurance Company in America"

ORGANIZED 1853

THE HOME INSURANCE COMPANY
HOME
NEW YORK

ELBRIDGE G. SNOW, President

"Service" in Fire Insurance

Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.

It means a " SERVICE " to Policyholders which is unexcelled. The Company's equipment includes:

1. Experts in every branch at its Head Office and in the Field.

2. Agents throughout the United States and its possessions, and in Canada, to write Policies.

3. Complete facilities for the Prompt Adjustment of Losses.

The advice which may be had gratis from the Department of Improved Risks, located at the Head Office, will be found especially valuable to large insurers.

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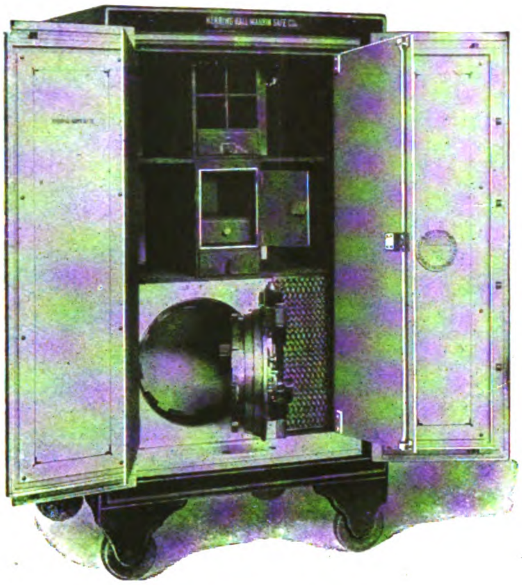
ALL BRANCHES OF FIRE INSURANCE

Automobiles, Commissions, Hail, Marine (Inland and Ocean), Parcel Post, Profits, Registered Mail, Rents, Sprinkler Leakage, Tourists' Baggage, Use and Occupancy, Windstorm.

STRENGTH REPUTATION SERVICE

HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



Fireproof and Burglarproof

SAFES, VAULTS & SAFE DEPOSIT BOXES

For Offices, Residences, Banks and Bankers

We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.

Plans and Specifications furnished without cost

Executive Offices
400 B'way, New York

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Hamilton, Ohio

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Boston, Mass. ***San Francisco, Cal.*** ***Chicago, Ill.***
Birmingham, Ala. ***New York, N. Y.***

***"Build it of Standard Products
—Make it Consistently Firesafe"***

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September, 1916

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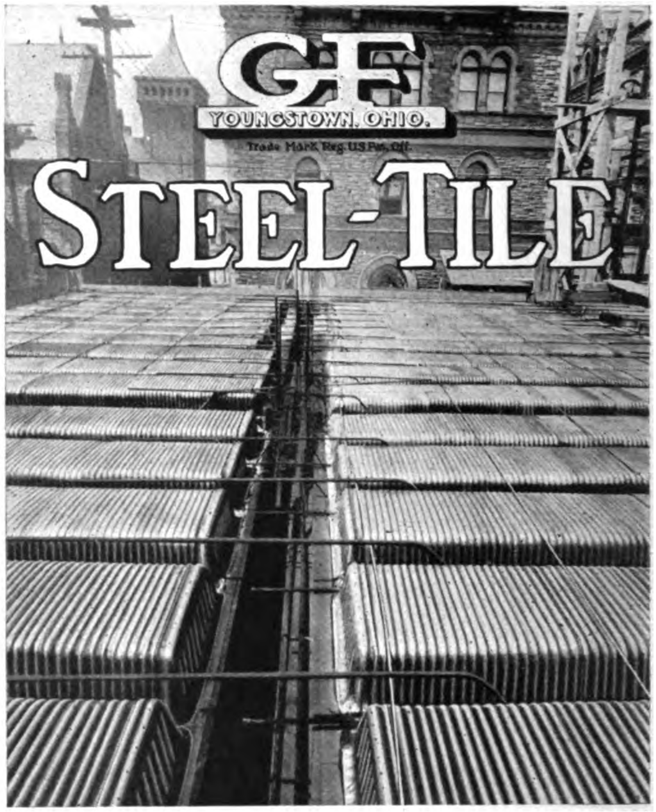
***Are You Boosting For
Fire Prevention Preparedness?***



Fireproof Floors

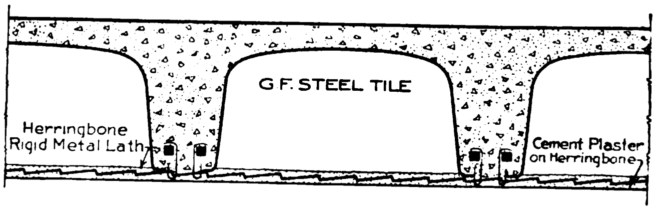
G-F STEEL-TILE floors save 45 to 60 per cent of the material required for other types of floors equally fireproof and strong. They reduce floor weight 35 to 45 per cent. They are more quickly and cheaply erected, reducing both labor and form work expense.

Used in all types of buildings, for a wide range of loadings and for clear spans up to 30 feet.

Get the Steel-tile Handbook

It contains designing data, drawings and specifications for the use of architects and builders. Sent without charge by addressing

**The General Fireproofing Co.
809 Logan Avenue, Youngstown, O.**



PREPARE AGAINST FIRE

"STAR" VENTILATORS

1,000,000 IN USE

Made in Galvanized Steel or Iron and Sheet Copper.

TYPES—

"Standard" "Fire Retarding" "Fire Retarding Skylight"

Cuts show Fire Retarding type, with Patent Gravity Damper, in closed position, also a Regulation Base, with a flat disc damper.

MERCHANT'S HIGH GRADE ROOFING PLATES

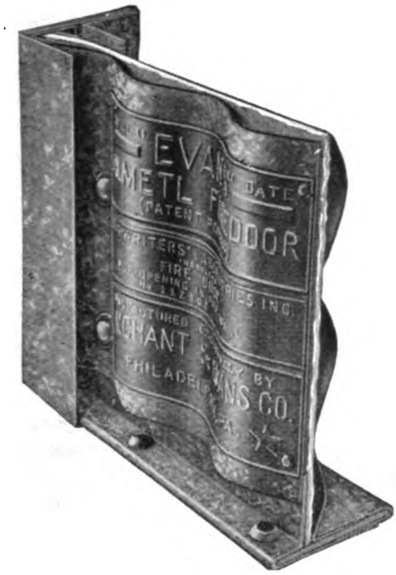
Tin roofing of the best quality, and properly laid, has acted as a definite fire retardant, not only against damage to interior of building from fire in adjoining buildings, but flames arising from interior fires are very frequently blanketed and kept from spreading by the tin roofing remaining intact.

"MERCHANT'S OLD METHOD"

Brand is the best fire-resisting roofing tin manufactured; Open-Hearth Copper-Bearing base; very heavy coating; Palm Oil process. Send for sample.

On each Sheet

We Stamp the Brand and Thickness

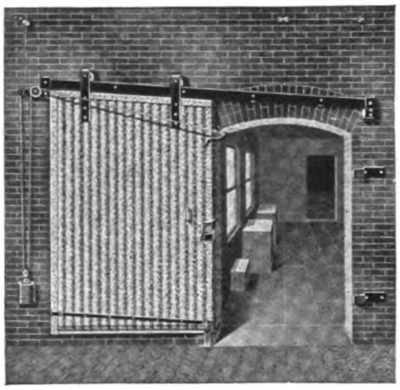


EVANS' "ALMETL" FIRE DOORS

(Patent Pending)

APPROVED by Underwriters' Laboratories.

ACCEPTED Generally by State and City Fire Control Bureaus.



Typical Installation Single Sliding Type

NOTE—

Sectional cut from actual corner of door showing No. 22 Gauge Galvanized Corrugated Cross-Laid Panels—Lined with $\frac{1}{8}$" Asbestos. The $\frac{1}{2}$" x $\frac{3}{16}$" Bar Iron Frame and the heavy No. 18 Gauge Galvanized Binder—prevents all damage to edge of Door. *No tin to rust—No Wood to Rot—Very Strong and Durable.* Installed anywhere.

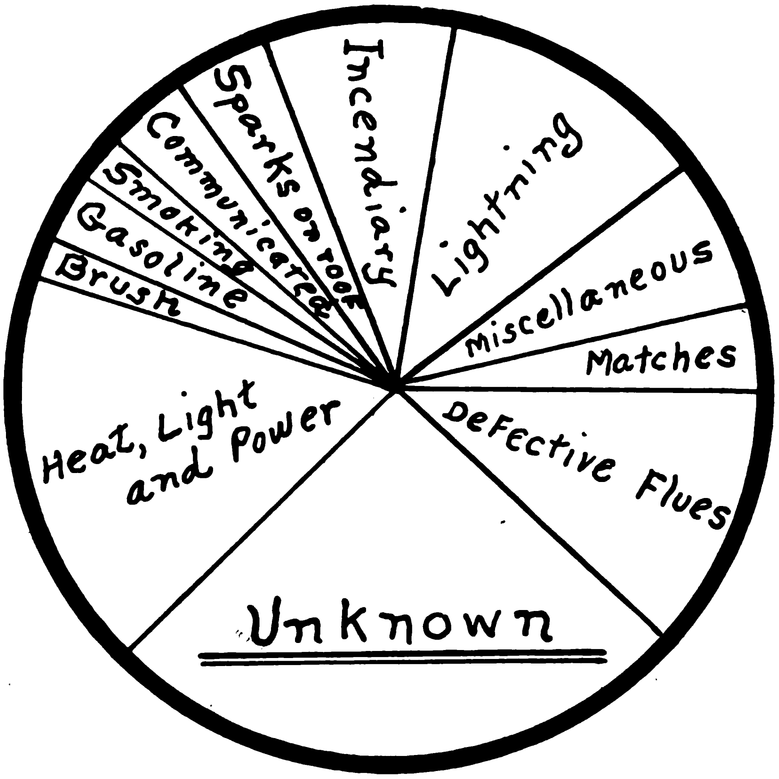
MERCHANT & EVANS CO.

SOLE MANUFACTURERS

PHILADELPHIA

NEW YORK
BALTIMORE
ATLANTA
CLEVELAND
WHEELING
CHICAGO
ST. LOUIS
KANSAS CITY

“Fires of Unknown Origin”



The above graphic chart illustrates the ratio of destruction by fires of unknown origin to the total amount of fires in the State of Wisconsin during the year ending June 30th, 1915, as shown by the report of the State Fire Marshal. In this State the recorded destruction by fire for the year was $4,364,195, of which $1,001,455 was caused by fires of unknown origin.

–Impossible When “Aero” is Installed

AERO AUTOMATIC FIRE ALARM SYSTEM discovers a fire in its incipiency and promptly sends out the alarm. Gives warning before the fire gets beyond control; summons help, when help is most needed, in the first stages of a fire—when it can be extinguished before serious damage has been done.

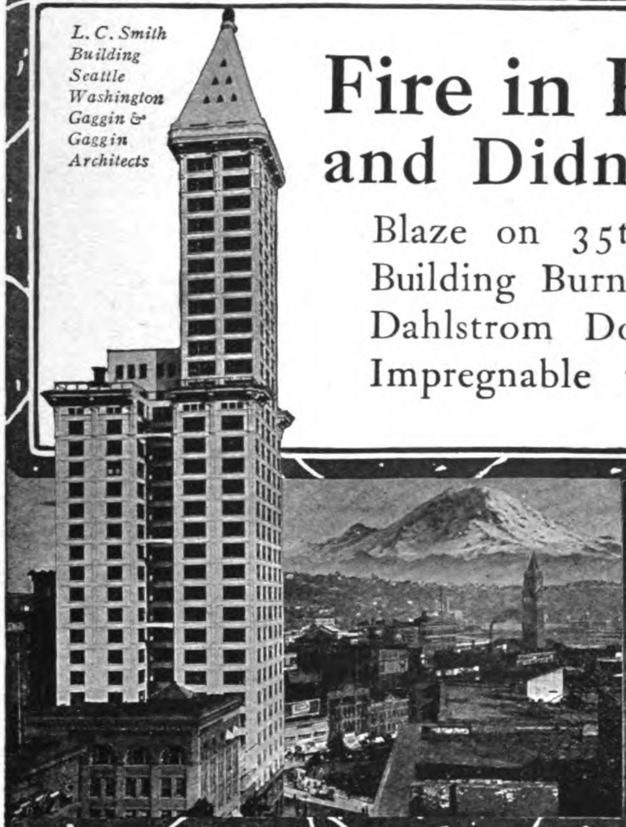
Investigate “Aero” Fire Protection. It is the most efficient least costly method you can install.

AERO FIRE ALARM COMPANY

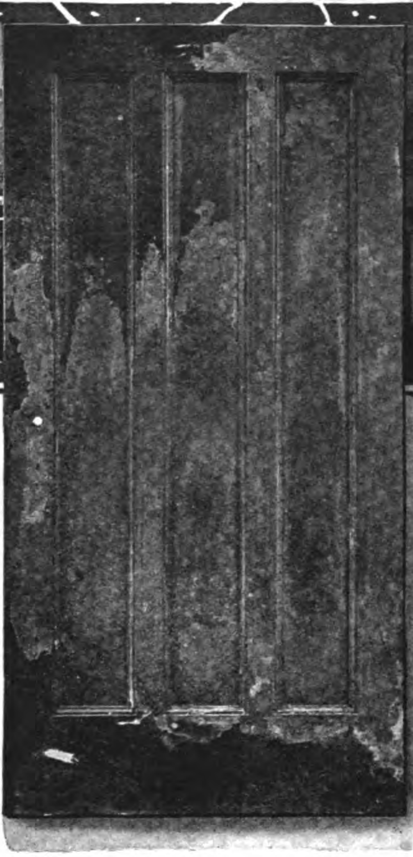
Havemeyer Building, 26 Cortlandt Street, New York

Fire in Pipe Shaft and Didn't Know It

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.



L. C. Smith Building
Seattle
Washington
Gaggin & Gaggin
Architects



Door Finish Only Damage Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.

The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.

Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire.

Your responsibility ends with the installation.

Write for all the facts.

DAHLSTROM PATENT DOOR
ARTISTIC EVERLASTING
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CONSTRUCTION
WITH A DEPARTMENT DEVOTED TO
SAFE HOMES

VOL. III SEPTEMBER, 1916 No. 3

The Sensible Roofing of the Home

By C. STANLEY TAYLOR

IN the matter of the sensible selection of a roof for the home there are three important factors: safety, economy and beauty. Their importance should be considered in the order given.

What is probably the most short-sighted policy pursued by the American public today is that which tends toward sacrificing safety to cheapness in building construction. The vast toll of destruction by fire and thousands of accidents which occur annually in and around the buildings of this country are directly traceable to false economy, to the saving of a dollar here and there in such a manner as to leave unbarred the gate of safety, and to invite that loss to life and limb and property which results in an economic waste of at least one billion dollars a year.

Not the least, in fact one of the important, causes of this loss is the improper roofing of the average man's home, and in the endeavor to direct the attention of the individual home-owner to the serious menace of improper roofing and to the value of safe, lasting and beautiful types of roofing, this article on the sensible roofing of the home is here presented.

What is Improper Roofing?

Improper roofing for the home may be defined as a roofing which will burn readily, thus subjecting the house to the menace of flying sparks and brands; a short-lived roof, or one which is not weathertight.

The matter of weather-tightness is one which need not be given much consideration at the present time, as it is naturally the first aim of the manufacturer of every type of roof to see that his product is one which may be laid in a manner which will keep out water and, in most cases, be proof against damage by heavy snow loads and high winds. There remain, then, the factors of safety against fire, and permanence, which present themselves as the important subjects for consideration.

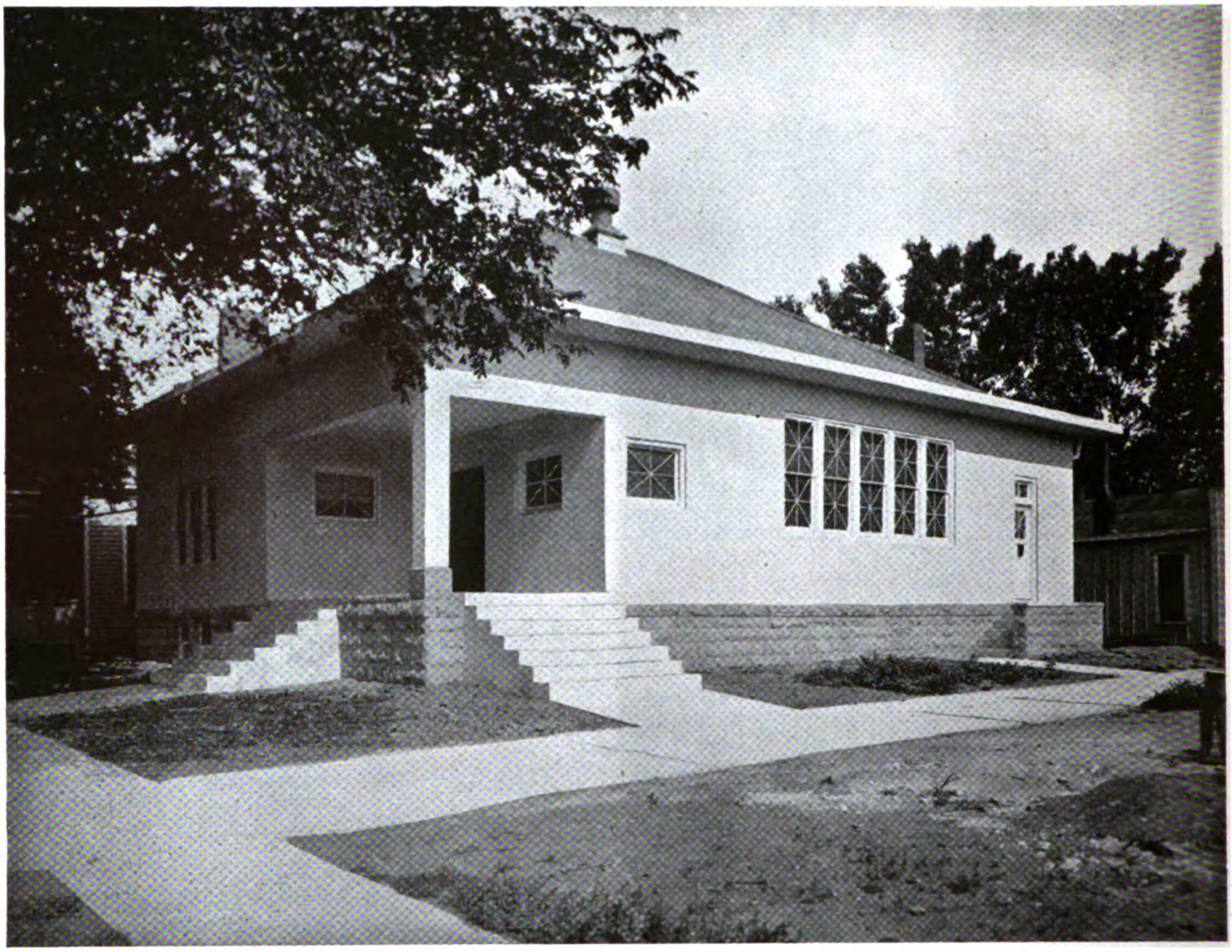
Safety Against Fire

A discussion of the subject of safety against fire naturally resolves itself into the usual heated argument of the wood shingle versus incombustible shingles. On the one side will be found the lumber interests, armed with countless arguments as to the merits of shingles of wood; on the other side the manufacturers of fire-resistive and fire-retardant roofings. In favor of the use of wooden shingles is the fact that this has for many years been a national custom, even as the fire loss has been accepted as a part of the national existence. In favor, too, of the use of wooden shingles, are claims of cheapness and the aesthetic value of weathered wood, together with highly prized examples of wood shingled roofs which have lasted from forty to sixty years or more.

Against the use of wooden shingles stands their undoubted accountability for millions of dollars of fire loss, for great conflagrations which have visited death and devastation on towns and cities, for lesser fires which have visited hardship and heartache on the individual home owner.

Then, from the standpoint of the home owner and the prospective home builder, this is a matter of careful investigation, simple but necessary.

If the use of wooden shingles presents a serious hazard, if it increases insurance and maintenance cost, if it is unnecessary because of the fact that many good unburnable types of roofing may be obtained at reasonable cost—why use wooden shingles? If, on the other hand, the wooden shingle is being unfairly blamed for fire losses, and if good wooden shingles are obtainable at fair prices, why not do as our forefathers did and



Firesafe church at Emporia, Kan. A typical asbestos and cement shingle roof and stucco exterior

roof the home with wood? Is it not a matter of common sense? Let us see.

The Lumberman's Opinion

First of all, in a consideration of the question of the hazard presented by the wooden shingle, what do the lumber interests think of their own product? To answer this question we will not turn to the individual lumberman, but to the excellent engineering bureau of the National Lumber Manufacturers' Association. Here we find this question being given serious consideration, and Technical Letter No. 2, issued by the Association on May 27, 1916, affords some interesting information which is directly to the point. It is headed "Tests of Fire Retardants, with Special Reference to the Shingle Roof." The letter was prepared by Herman and Arnold Von Schrenk, well known as consulting engineers, and covers the subject of "making wood more or less fire-retardant or fire-resistive." On the second page we note the following statement:

"*The problems.* It was inevitable that, early in the development of the investigations, we were confronted with an increasing number of problems and with a growing realization of the necessity for widening the scope of the investigations if we were to obtain the practical results contemplated. *It should be remembered that the problem of first importance is getting an efficient fire-retardant shingle roof. The application of the fire-retardant must result in reducing the flying-brand hazard, and this must be done at minimum expense.*"

And again, in the concluding paragraph, we note:

"The results certainly indicate that there is every probability that a number of substances will be not only practicable, but fairly cheap, which, with simple directions, can be applied by the ordinary house owner, and give him a high degree of fire protection, whether on a roof or in a building. The time is now here when advantage should be taken of the facts so far ascertained, by enlarging on the scope of the demonstration tests. When such enlarged determinations have been made there will be no reason why the manufacturers of lumber should not go before the public with a perfectly definite and concrete statement as to what may be reasonably expected of their product *when properly safeguarded.*"

Apparently there is something to the statement that wooden shingles present a serious fire hazard. It seems illogical to think that the lumber interests would take the pains to fireproof wood unless it was necessary.

How Dangerous, Then, is the Wooden Shingle?

In the analysis of one of the greatest problems which confronts the American public today—that of the annual fire loss—one fact stands out clearly above all others—*the inflammable roof constitutes the greatest single fire hazard in America!*

The proof of this statement has assumed gigantic proportions and is being added to daily, as reports come in from every section of the United States and Canada—"Entire Town Destroyed by Fire," "Flying Brands Set Fire to Thirty Homes," "Conflagration Wipes Out Residential Section," "Hampton Beach, N. H., Destroyed by Fire," "$14,000,000 Fire Loss at Paris, Tex.," "Augusta Swept by Flames"—Truly the shingle roof route to destruction is widely advertised!

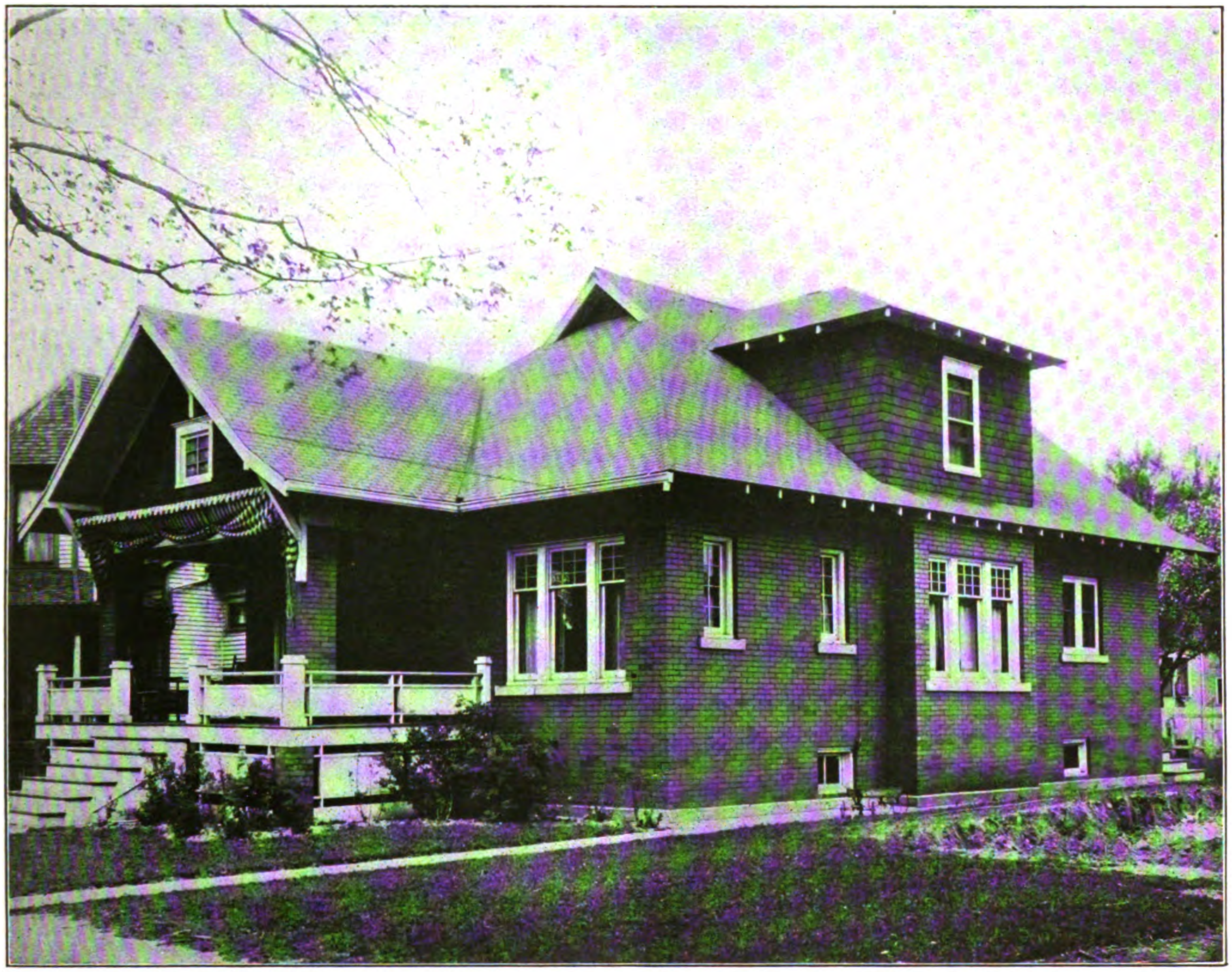
The Conflagration Hazard

With only a passing consideration of the many comparatively small fire losses caused by the communication of fire from one building to the roof of another, the question of staggering conflagration losses immediately presents itself as of paramount importance.

It has been said that a conflagration resembles a chemical reaction in many ways. This is true. A careful analysis of a conflagration shows four elements to be present: a spell of hot, dry weather; high winds; a preliminary quick, hot fire—*and inflammable roofs.*

Obviously, if at least one of these elements is removed, the conflagration cannot take place. Naturally, the elements of weather cannot be controlled. The quick, hot fire can only be prevented by general unburnable construction, which will not become a reality until the many fire traps which cover our country rot; or, according to the law of probablity, burn; but the *roofing element* can and must be so changed in character that it will no longer combine in the general reaction—thus making the conflagration practically impossible.

The absolute inability of any section, where shingle roofs are prevalent, to resist the onslaught of a conflagration is pitiable; the fire blazes hotly and the burning embers are carried by the wind to start several fires in different sections. Almost immediately the fire depart-



A typical asphalt shingle roof and brick exterior house. This roof provides safety from conflagration danger ment is rendered helpless; two or three fires can be coped with at one time, but when from ten to thirty fires start at once, and each contributes to the general disorder, there is no remedy.

Every year the volume of the American fire loss is increased from 10 to 40 per cent by the burning of communities or sections of communities, the spread of the flames being primarily due to improper and hazardous roofing conditions. For the purpose of graphic illustration of the real cost of inflammable roofing materials, a careful consideration of some of these great losses seems advisable and will prove of interest.

Conflagration Losses

Massachusetts, and in fact the entire country, is now using the Salem conflagration as a strong argument against the continued use of the wood shingle.

The Salem fire started in a frame leather factory, which was roofed with wood shingles, scattering the blazing shingles, which were carried to surrounding buildings by the high winds, thus starting a general conflagration. Many witnesses saw shingle roofs burst into flames long before the fire reached them, ignited by the great heat generated by the conflagration. House after house blazed as the rain of sparks fell on the timber-like shingle roofs, setting fire to them.

The responsibility of the shingle roof for the Salem conflagration was recognized immediately by local authorities, and the city council promptly passed an ordinance prohibiting the use of such roofs thereafter.

The day the Salem conflagration ended, at the water's edge, the Salem *News*, the leading daily of the city, said in its editorial on the fire:

"Any view of the conflagration which ignores the virtual university of the wooden shingle will lose sight of one great contributing factor to the development of the fire. These shingles were so many invitations, in time of drought, to fire. With their curled and jagged edges pointing upwards, they offered lodgment to the flying embers, borne in varying volume far beyond the confines of the zone of fire. In plain words, wooden shingles have cost the city of Salem several million dollars. In the days of rehabilitation to come, when pros and cons are weighed, and discussion concerns itself with a variety of measures, remedial or normal, this signal fact is bound to be recalled."

Within the past ten years two serious conflagrations have occurred in Hot Springs, Ark. In both instances the spread of the flames was mainly due to the shingle roofs of the dwellings in and near the fire limits.

The territory burned over in the first conflagration, February, 1905, consisted of 122 acres. On September 5, 1913, the second conflagration burned over an area of 133 acres, including about 56 acres of the rebuilt section, and only ceased because the wind died down, thus stopping the carrying of brands to shingle roofs and offering an opportunity to check the fire.

The fire hazard still exists in Hot Springs, and they are again putting shingle roofs on houses outside the fire limits—even in that section which has twice burned over! Comment is unnecessary.

The great conflagration at Bangor, Me., early in 1911, was commented on in the National Fire Protection Association report as follows:

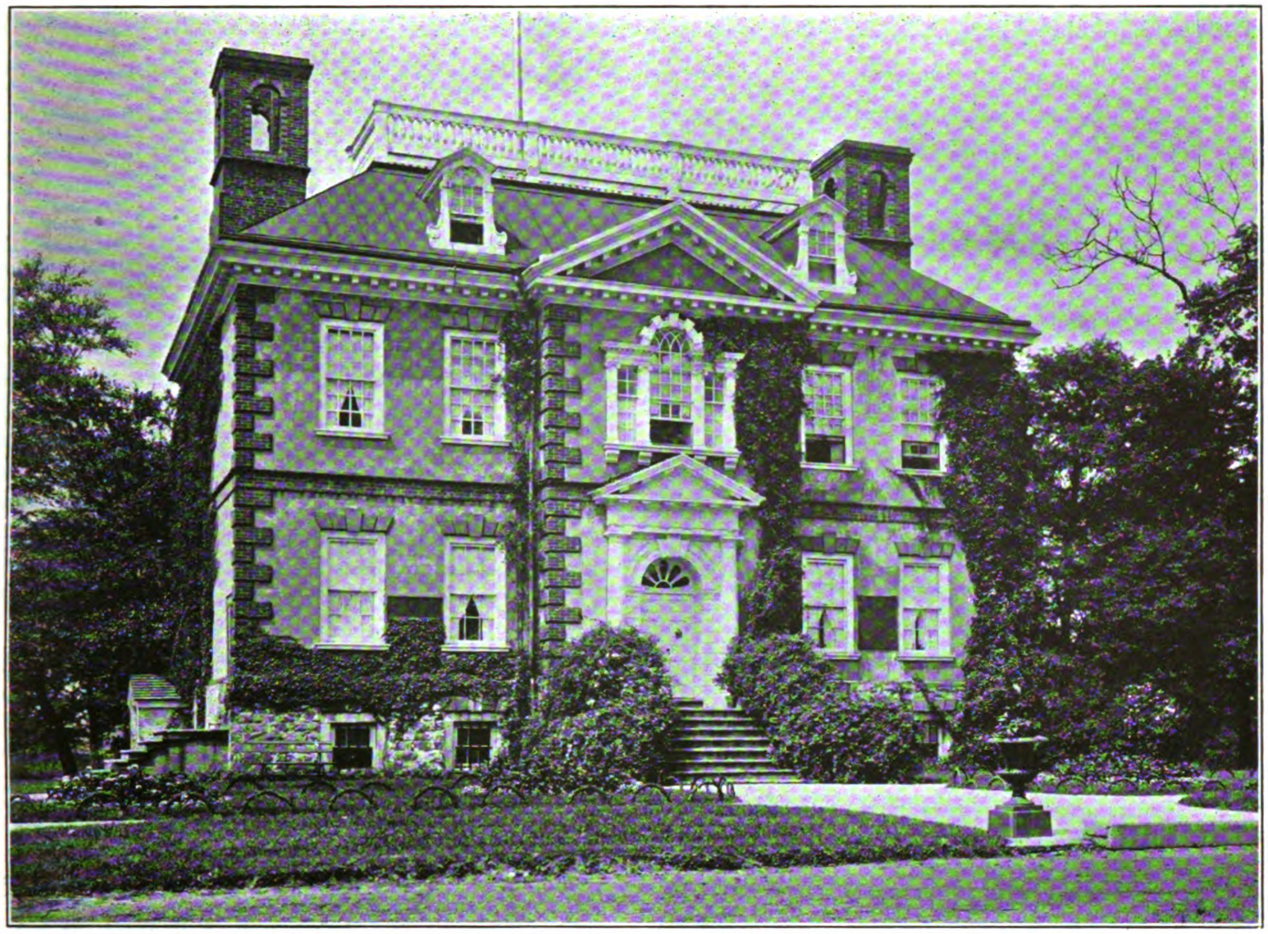
"In the area swept by this conflagration the structural conditions were not good, the congested value section being almost devoid of the ordinary fire stops, such as solid fire walls (i. e., without openings), and parapets, protected window and door openings. There were practically no fireproof or mill constructed buildings, neither buildings equipped with automatic sprinklers, nor other effective fire protection in the burned area. There were *many shingle roofs* in the congested value district, and in the residential district, surrounding it."

The loss here was $3,500,000.

The entire premium income of the fire insurance companies in Maine during 1911 amounted to about $3,000,000, with aggregate losses in the same period of $4,000,000, or 133 per cent. Add to this the customary 40 per cent for expenses, and an idea may be had as to what wood shingle roofs cost the insurance companies, and, in turn, the general public.

Conditions in Providence, R. I., invite a disastrous conflagration. Many wooden structures with wooden shingle roofs line the narrow streets even in the fire district. At any time a conflagration could find several direct pathways into the heart of the business district. In the Atwell's avenue section nearly fifty thousand people are housed in wooden buildings packed closely together and roofed with wooden shingles. At least 85 per cent of all dwellings in Providence have wood shingles.

Boston is regarded as supplying the greatest fire hazard of any city in the United States; this notwithstanding its admirable high-pressure water service and well-disciplined fire department. The menace is caused, not by the buildings in the downtown section, but by the residence properties principally in the suburban communities of Somerville, Dorchester and Cambridge. While separate municipalities, these centers so closely adjoin Boston proper as to constitute practically part of the city. The old type of detached residence has given place to the three-deckers of the industrial workers, solid rows of these stretching around in all directions. Underwriters are clearly aware of this great conflagration hazard. A fire, starting under the right conditions, would spread to the *wood shingle roofs* and wood gingerbread ornamentations so quickly as to become unmanageable, burning out the entire section and seriously threatening the city itself. Owing to this fact, one of the largest companies in the business has recently reduced its liabilities in this section to the

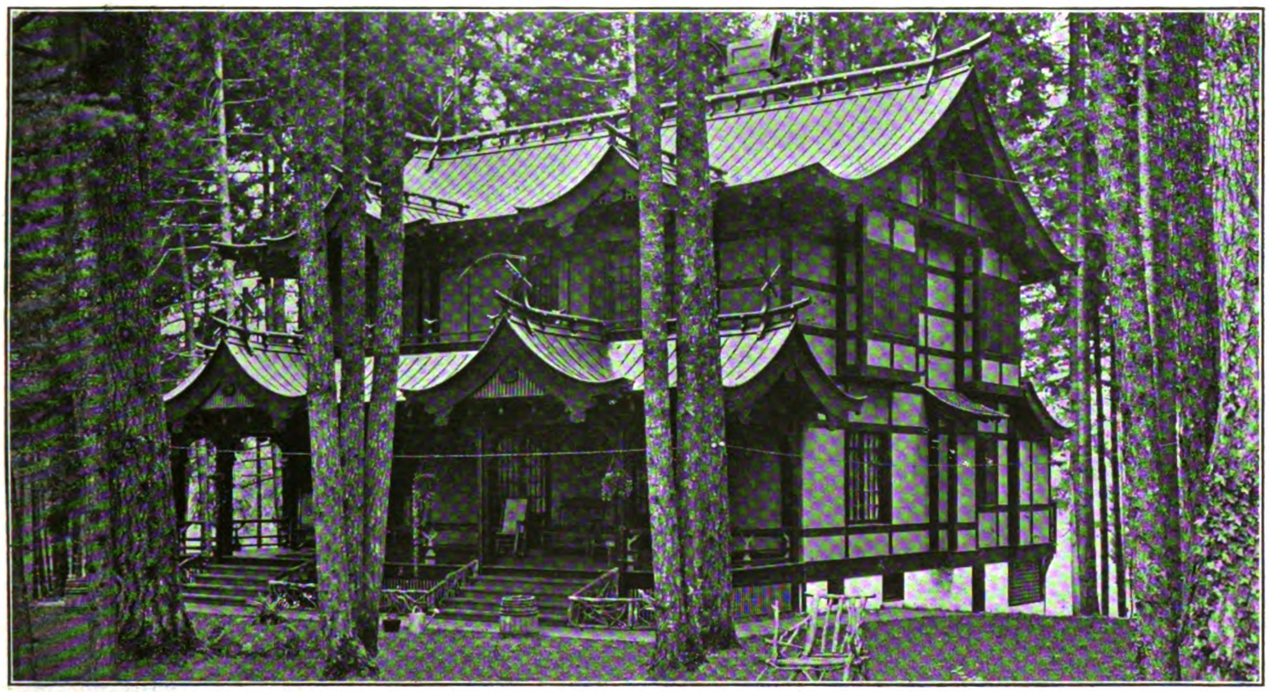


Courtesy of N. & G. Taylor Co., Phila., Pa.

MT. PLEASANT MANSION, FAIRMOUNT PARK, PHILADELPHIA, BUILT 1761.

This building is considered one of the finest examples of pre-Revolutionary domestic Colonial architecture in existence. It stands on the east bank of the Schuylkill River, high above the stream, in what is now Fairmount Park. In the early days it was occupied successively by the original owner, John MacPherson, merchant and mariner of Philadelphia; by the Spanish Minister, Don Juan Miraille; by Benedict Arnold, and by the Hon. Edward Shippen, Chief Justice of Pennsylvania. Major General Baron DeSteuben, Inspector General of the Army under Washington, also resided at Mt. Pleasant for a number of years. It became the property of the City of Philadelphia in 1868, and is now occupied by the Moviganta Klubo, the Women's Automobile Club of Philadelphia.

The tin roofing upon the building is an interesting example of the use of this roofing material in residence construction. On the sloping visible portions of the roof, the tin is laid with standing seams, and on the flat deck with flat seams, following the usual practice commonin the trade for more than a century.



Courtesy of N. & G. Taylor Co., Phila., Pa.

THE LEO. H. LONG RESIDENCE, STEILACOOM LAKE, WASH.

This is not a Shinto temple from the Island Empire of Japan, but an original idea for a Summer cottage among the pines of Washington. We show it as an excellent example of the well known adaptability of tin roofing to irregular curved surfaces. The tin roofing not only carries out the architectural effect perfectly, but also provides an exceedingly durable and fireproof roofing. It can also be painted to harmonize with the color scheme of the building. The architect has carried out the Oriental design faithfully, even to the chimney.

extent of $1,000,000—one-third of its former business in that district, which indicates its opinion.

In every farming district, where fire apparatus is scarce and the wind has open range, the hazard of the shingle roof is especially severe and should by all means be eliminated by encouraging, or, if necessary, enforcing the use of unburnable roofing materials.

It is interesting to note that more and more the rural population of this country is turning to fire prevention by safer construction and the proper fire-protective equipment of houses and out-buildings.

Lower Insurance?

What of the insurance cost, then? Surely this should be additional proof either for or against the use of the wooden shingle. The simplest manner in which to arrive at a proper conclusion in this matter is to ask insurance rating bodies in different sections of the country.

The Insurance Viewpoint

There are undoubtedly no keener judges of fire hazards than those engaged in the business of fire insurance. Their judgment is based purely on business reasons and must, therefore, constitute the cold-blooded dollars-and-cents viewpoint. Following are their opinions *and actions* in this matter:

Mississippi Inspection and Advisory Rating Company has recently issued an amendment in which a credit of 20 per cent is given from the basis rate of building having non-combustible roof, as an incentive to property owners to use roofs of this kind.

Kansas Inspection and Fire Prevention Bureau has recently issued a booklet in its "Pointer" series, entitled "The Aviation of the Hot Shingle," in which is said in part:

> But, you say, "How about that *Shingle Roof?*" Well, it is a special menace in the larger value mercantile district, and should be forced out by ordinance, as it has an "open armed" tendency to a flying fire brand from even an insignificant bonfire, as at Chelsea, Mass., or à la Bangor, Me., when the burning shingle aviated half a mile to a shingle-roof church; or, coming closer home, in Atchison's recent fire loss "contribution" a flying brand fired a church—in fact, seven fires broke out simultaneously from aviating brands. This "bird-fire" is bad business to have around *shingle roofs*.
>
> The difference in premium on your risk will well-nigh pay the difference in cost of a good metal, slate, tile or approved composition roof, when compared with the
>
> **Inflammable**
> **Shingle**
> **Roofs.**
>
> In many of the Special Hazard risks, *i. e.*, manufacturing properties, the Schedule for rating reads:

"If shingle roof, charge (per hundred)..	.25"
For example, $5,000 is placed on building, at 25c. excess in rate for shingle roof, or total per annum of.............	$12.50
For $7.000 on contents in this warehouse, we also have in excess per annum for shingle roof.........................	17.50
Total annual charge on the hazard of shingle roof is......................	$30.00

> If $30,000 per year for five years saves $150.00 towards equalizing the differential in cost for a superior non-combustible roofing, and your property has been in the meantime a safer risk from the "bird-fire," or spark hazard, you have made a good investment, see!
>
> Now, on the other hand, rating schedules recognize *shingle roofs* in the *mercantile* class by a percentage charge which varies from *10 to 15 cents.*

Virginia Inspection and Rating Bureau: "The underwriters in the Southern field look with disfavor upon shingle roof construction, and feel that all influence should be brought to bear against the erection of shingle roof buildings. In this territory shingle roof buildings carry a higher rate than buildings covered with metal, slate or approved composition."

South-Eastern Underwriters Association: "We are naturally opposed to the use of wood shingles as a roof covering anywhere, but especially in cities where the hazard from sparks and flying brands, and the conflagration hazard, are the most to be feared. Our attitude is clearly indicated by the rates applicable to buildings covered with wood shingles and those using incombustible roof coverings, the penalty charge for the shingles varying from five to twenty-five cents with the classification of the town and the character of the building covered. In most instances, however, the penalty is from fifteen to twenty-five cents."

Chicago Board of Underwriters, Chicago: "This board does not advocate shingle roofs, but they are not prohibited on dwellings; on the other hand, a credit of 10 per cent is allowed for non-combustible roof as listed by our laboratories. On risks rated under our Analytic Schedule a charge is made of 20 per cent, and under the Manufacturing Schedule of 25 per cent."

Board of Fire Underwriters of the Pacific: "Deficiency charges are imposed as follows (for the use of wood shingles):

Frame or brick electric power plants, .20 and .25.
Brick buildings, 25 per cent of key rate applying.
Frame woodworkers, .50.
Canneries and packing houses, .15.
Apartment houses, 25 per cent of the key rate.
Mining plants, .25.
Laundries, .15.
Rice mills and meat-packing houses, .25.

Underwriters Association of the Middle Department: "Where (wooden shingles) found in evidence we exact increase in rate over above rate which would obtain on risk with fire-resistive roofing of from 5 to 25 per cent, depending on the class of risk as to occupancy."

Suburban Fire Insurance Exchange: "While this body (which makes the rate for Long Island and the suburbs of New York) make no general penalty for the use of wood shingles on any but otherwise fireproof houses, it is understood that there is a strong agitation on the part of members to follow the general practice of other similar bodies throughout the country."

Underwriters Association of New York State: "We are most decidedly opposed to the use of wooden shingles as a roof covering. We are endeavoring as far as possible to secure the adoption of building codes and ordinances that will prohibit the use of wood shingles, especially in the more thickly built-up portions of cities, towns and villages. Many communities have within the past two years adopted such restrictions. It is not necessary for us to comment on the part played in great conflagrations in this country by combustible roofs, and of course the shingle roof is the most combustible.

"In reference to shingles as a rating factor, let us say that under our dwelling schedule a penalty of five cents per $100 on a three-year policy is charged for the presence of a shingle roof on a dwelling. The charge is not exactly uniform in connection with the rating of other classes of property. In a general way it runs from ten to fifteen cents per $100 per annum."

The National Viewpoint

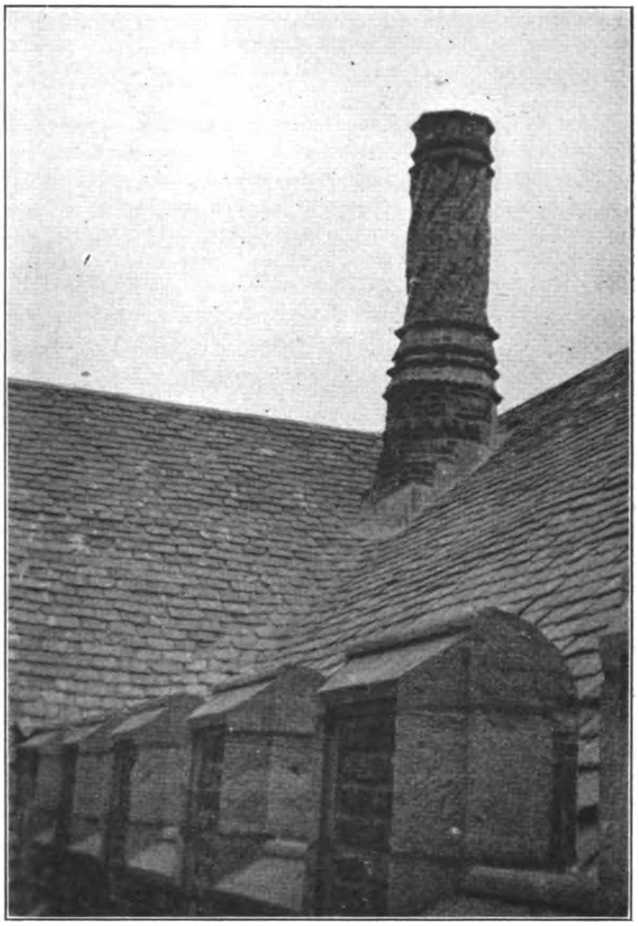
Of further interest in this connection are the opinions and activities of various associations and individuals interested in the reduction of the fire waste.

George R. Williams, president of the *Georgia Fire Prevention Society,* which has been active in the war against the wood shingle, makes some very interesting and apt comments on the situation to-day:

"A specific effort is always made in every town inspected to induce the city councils to adopt such an ordinance as will prevent the future use of any wooden roof, and I presume that the only objection ever made to accomplishing the desired result is through the manufacturers of shingles, which is perfectly natural, perfectly legitimate, and is due largely to themselves. We try and answer this argument that it appears very difficult at the present time to secure really a pure heart No. 1 shingle, and when they can be secured the cost of same is practically that of a non-combustible shingle, which naturally tends to prevent the spread of fire, but also gives the owner or occupant a lower insurance rate.

"It is always very hard for any artisan to reconcile himself to developments in his particular line of work which is conducive to lessening the use of human hands. The linotype has perhaps done away with many old-fashioned printers; the newspaper folding machine has likewise interfered with boys and girls who used to perform this work; the safety razor has no doubt materially injured the barber's profession; the dictaphone is, in a measure, doing away with time consumed in stenographic work. In fact, the commercial progress that we are seeing every day has its evil effects on some just as its beneficial effects on others; and we might say that it is certain in time, and perhaps at no great distant future, that the shingle roof will be considered a like menace to any other accepted hazard of a dangerous nature.

"The work being done by the various State organizations of Fire Prevention Societies is exerting every effort to educate the people along these lines, and it is astonishing indeed how little consideration is given to matters of this kind by people of great intellect and opportunity, and it seems that the only way that we can accomplish the entire retirement of wooden roofs is by year after year to be devastated by the great fire demon, spread by the wooden shingle roofs, just as typhoid and malaria has been spread by insects."



Slate reproduction of Old Tudor stone roofing. Stephen Duncan residence at Newport, R. I.

From the *Rochester Chamber of Commerce* we learn that: "There is at present an agitation before this organization in favor of such legislation (against the wood shingle roof). Our Fire Prevention Committee has formally gone on record in favor of barring the use of wooden shingles on roofs of new construction. When we have completed our work of gathering statistics in favor of such an ordinance for presentation in a referendum vote to our membership, we will be pleased to forward them to you. In return we would appreciate your courtesy in keeping us posted on developments in the national campaign you are starting. We would like also to receive any information and data that will have a bearing on the agitation in Rochester."

John A. O'Keefe, *Fire Prevention Commissioner of Massachusetts,* says in part:

"In the metropolitan district of Boston, I have been especially interested in stamping out the use of wooden shingles. Our experience has been that ordinarily they are a common cause for fires, and that when conditions combine in some exceptional manner they are a menace to the city. Proofs of that may be found in the stories of the Salem and Chelsea fires.

"Last fall, under my suggestion, a committee representing the twenty-six cities and towns of the metropolitan fire prevention district of Massachusetts, after mature consideration of this matter, recommended that wooden shingles be not used for roof covers in the metropolitan district. The feeling was, at first, that a resistant shingle of some sort or other be used. Since that time several cities and towns have adopted the recommendations; others, unfortunately, have not."

These cities and towns which have adopted ordinances restricting the use of wooden shingles are:

Brookline
Everett
Melrose
Somerville
Cambridge
Lynn
Quincy
Medford
Newton
Revere
Chelsea

The Mississippi Society for the Prevention of Fires expresses the following opinion: "Our society is making a very strenuous fight towards having the shingle roof give way to those of non-combustible character. In fact, I might say that there is no section of the South where the shingle roof is more in preponderance than in Mississippi, and we believe that it is the cause of a great many fires, due to sparks on roof, and also conflagration feeders."

The office of the *Schedule Rating Expert for New Jersey* makes the following statement in a letter to CONSTRVCTION regarding the shingle roof hazard:

"We discourage the use of wood shingles for roofing dwellings at all times and recommend the use of an incombustible roof covering; in fact, from time to time we recommend to the various municipalities in the State of New Jersey the adoption of an ordinance prohibiting combustible roof coverings."

The State Fire Marshal of Illinois says:

"All buildings having shingle roofs possess a particular menace, not only to adjacent buildings, but also to buildings of like construction in the immediate neighborhood. *This menace is the shingle roof.* Burning shingles are carried great distances by the wind or draft of the fire, and when they alight on other shingle roofs create fearful havoc. Thus, the wooden shingle furnishes not only the fire brand, but the tinder which it ignites.

Copper shingles

Courtesy of Merchant & Evans

A roof of metal shingles

"During the hot, dry months of summer and autumn wooden shingles become like tinder and many fires are caused by sparks from flues and chimneys alighting on such roofs. During the year 1914 flying sparks caused 1,731 fires in the State of Illinois, and of this number 1,145 were caused by sparks alighting on shingle roofs. These fires caused a damage of $643,841. This amount does not constitute the entire damage caused by the shingle-roof hazard, because it only includes the damage to those buildings in which the fires originated, and does not take into consideration the fact that a large part of the 994 fires reported as having been caused by exposure the original fire was due to sparks alighting on shingle roofs."

From M. B. Leach, Building Inspector of Houston, Texas, some very interesting information has been received. After stating that in his opinion the wood shingle, if used at all, should be limited to the outlying districts which are sparsely settled, Mr. Leach says that at present there is a strong prejudice in Houston toward the use of the wood shingle because in recent storms many fire-resistive roofings failed to withstand wind presure, this fact being due to poor workmanship and improper application.

We have taken into consideration the activities of the lumber interests in investigating for the purpose of finding means to safeguard wooden shingles against flying sparks and brands; we have considered the awful devastation wrought by conflagrations and the part played therein by the wood shingled roof. We have inquired of insurance experts and found that they favor firesafe roofing in a substantial manner; we have sought the national viewpoint. and found it justifiedly against the use of non-fireproofed wooden shingles.

Why, then, *should* we use wooden shingles? Posibly because they are cheaper—perhaps they are more substantial, longer lived and more beautiful than the shingles of unburnable mineral matter or metal which we have been taught by the lumbermen to call "substitutes" for wooden shingles.

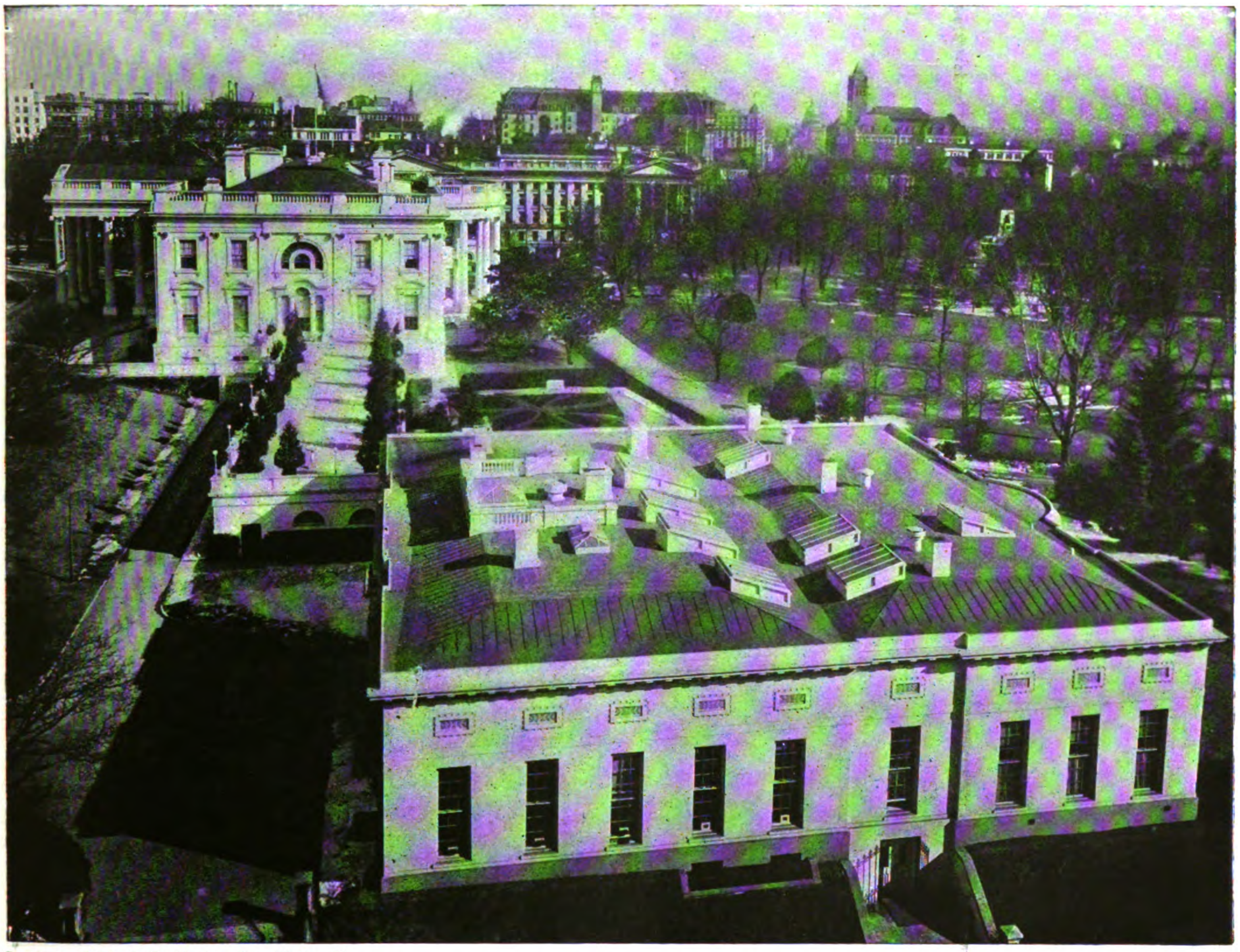
Let us consider the various types of fire-resistive and fire-retardant shingles, and after having done this, take up the matter of wind pressure and snow loads on the roof, and the important matter of the cost question in conclusion. Then surely we will be thoroughly acquainted with the subject of the sensible roofing of the home.

Proper Roofing

The discussion of the dangers attending the use of wood shingles naturally leads to a careful consideration of the various types of roof coverings which have been primarily designed to overcome the fire hazard.

A former dominant factor in curtailing the general use of fire-resistive and retardant roofing—cost—has rapidly become a thing of the past owing to the placing on the market of many types of shingle roofing, some of which are absolutely unburnable and others which at least counteract the most serious roofing hazard, that of flying brands. A brief consideration of the various shingle types of firesafe roofing will be of direct interest to architect and property owner alike.

In the consideration of the costs of various types of proper roofing shingles, it must be remembered that a fair quality of wood shingle costs, on the average, $5.50 a square (100 square feet of roofing). The various types of roofing which sell at prices higher than this will last twice as long and need far less repairing than the wood shingle roof, while at the same time they reduce insurance costs and remove the danger of fire from an outside source. The ultimate cost is always the



Courtesy of N. & G. Taylor Co., Phila., Pa.

THE WHITE HOUSE, WASHINGTON, D. C.

The White House, the foremost residence in the Nation, is roofed with tin; so is the President's office building, adjoining it. Notice in the photograph the fine, neat appearance of this metal roofing—proof against fire and all kinds of weather. And this excellent material is not a high-priced luxury, beyond the reach of the average purse. Any home builder who takes pride in getting good materials into his new house can get, at a moderate price, the same kind of roof that covers the Presidential residence, office, and garage.

Courtesy of Merchant & Evans **Metal tile on cement house**

real cost. Nowhere does this better apply than to the purchase of roofing materials.

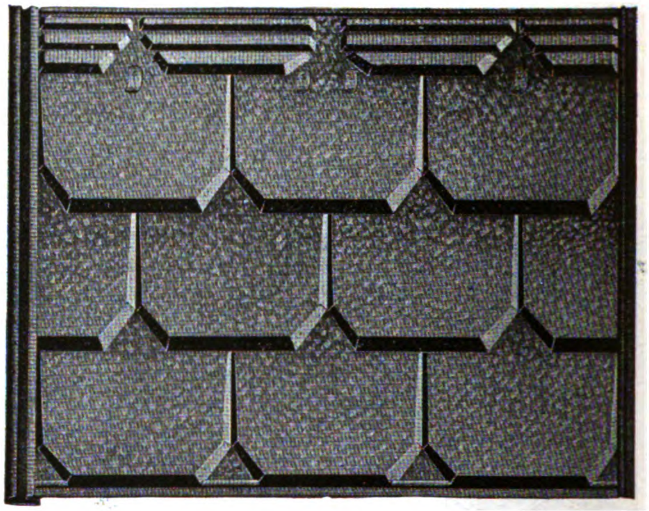
It is the purpose of the following descriptions to direct the attention of prospective homebuilders to various obtainable types of fire-retardant roofing.

Asbestos Shingles.—The asbestos shingle, as manufactured and widely used throughout the country, is composed of about 15 per cent asbestos and 85 per cent Portland cement. This shingle is manufactured by the "building up" process, layer by layer, or by the method of moulding slabs and compressing them under hydraulic pressure. The resultant material is not unlike stone, and is fireproof, water and weather proof, presenting a pleasing appearance, being manufactured in various shapes and colors.

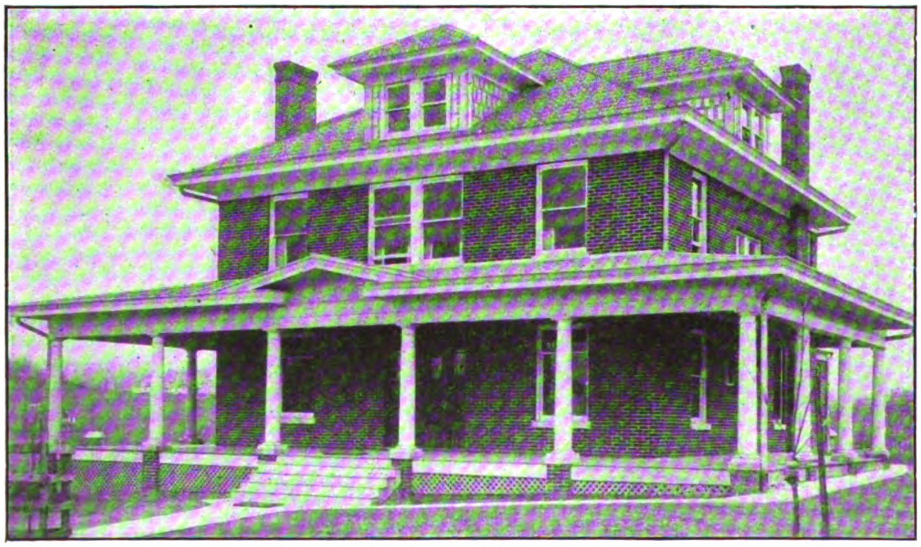
The weight of these shingles runs about 220 to 700 pounds to the square and the cost varies from $7 to $15. This type of shingle is absolutely fire-resistive and has an excellent effect in blanketing the flames.

Concrete Roofing.—Many dwellings in the Middle West are being roofed with concrete slabs. Various patented steel forms for reinforcing are laid on the roof supports and about 2½ inches of concrete laid. Over this is spread a layer of waterproofing. This is an excellent type of fire-retardant roofing.

The accompanying illustrations (Page 153) show an excellent type of concrete roofing in course of construction. Here the reinforcing consists of a series of heavy cold-drawn steel ribs 11/16 inch high, spaced 3 5/8 inches center to center and connected by diamond mesh expanded metal, forming sheets of reinforcing.



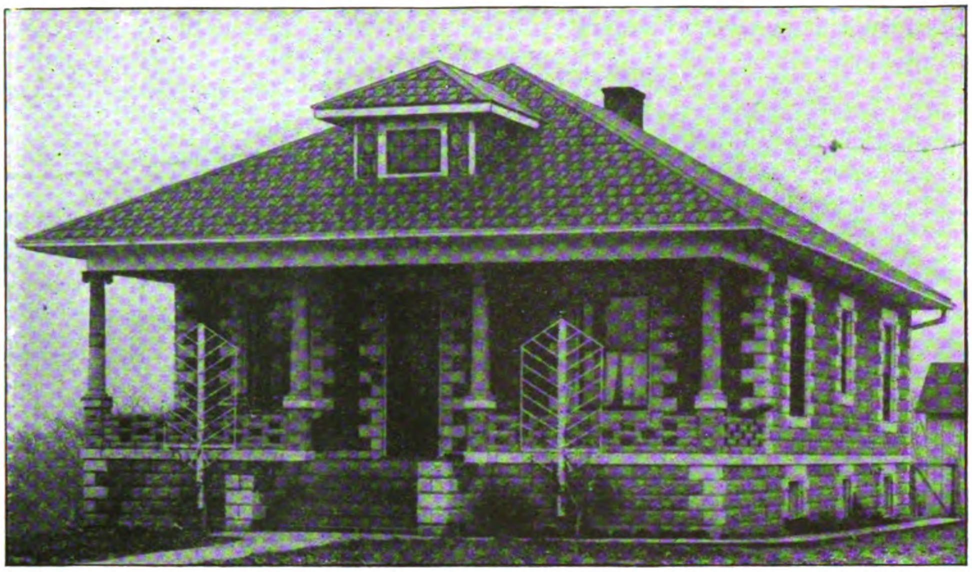
Steel shingles



Courtesy of Berger Mfg. Co. Metal shingles on brick house

These sheets are laid over the roof purlins, attached to them securely by clips, wire nails or staples and the concrete applied to the required thickness. Enough of the mix passes through the mesh to thoroughly imbed the steel; and the under side being plastered with cement mortar, the roof is complete and ready for waterproofing.

Slate roofing, properly applied, makes a long wearing and absolutely fire-resistive roof. Almost invariably, investigation shows that the failures



Courtesy of Berger Mfg. Co. **Metal shingles and block walls**

of slate roofing have been caused by poor workmanship and improper practice.

Slate, or clay tile, constitutes a heavy dead-load which must be taken into consideration in the designing of the supporting members. The ordinary commercial slate shingle runs about 750 pounds to the square, and the cost averages $8.50, complete on the roof. This slate usually runs about three-sixteenths of an inch in thickness. For other thicknesses the costs can be computed by figuring a weight of 4,000 pounds per square per inch of thickness.

In the application of slate shingles, steel nails should never be used. To this practice alone many of the failures can be attributed. The slate should be drilled and countersunk, and nails with lead washers are most satisfactory. In the ordinary "punched slate" the countersunk surface is always rough and the nails almost invariably will be found to hold at one point only.

Sharp-shouldered nails should never be used and bronze composition or copper nails should be used in the place of steel, which rusts and allows loosening.

In the matter of the protection of slate roofing against wind-pressure and driving snow a noteworthy example of proper roofing construction has just been completed at Newport, R. I., on the beautiful residence of Stephen Duncan. Here slate of varying thickness and colors was used to give an almost exact reproduction of the old Tudor stone roofing so often seen in the picturesque sections of England. The accompanying photograph will give some idea of how the effect was brought out. The slate shingles were laid in weak lime-cement mortar for the purpose of obtaining strength and durability. The cost figures about $17.50 per square.

Slate in its various forms has many possibilities for architectural beauty, owing to its wide range of colors and textures. Greens and grays have been most successfully used in Italian style for country homes.

The architect is cautioned in the selection of slate, where a certain degree of weathering is wanted, to be sure that the stock is already weathered or comes from the larger quarries where the rock is of known weathering index.

From the fireproofing standpoint, slate can be recommended if it is carefully applied; and it is clearly the duty of those interested in the manufacture and use of slate for roofing to do everything possible for

Courtesy of Berger Mfg. Co. **Slopes and curves in metal shingles** the forwardance of the knowledge of the proper use of this material.

Tin Roofing, as shown in the various accompanying illustrations, is well adapted for use on residences and has the advantage of being available for curving slopes and special and difficult conditions.

The tin roof forms an excellent fire-retardant, being incombustible, and also exercises a blanketing effect in case of fire. This roofing must be painted with a good paint, and when properly erected and prepared will last for many years.

Plates for tin roofing should be prepared in the shop, and one side for use next to the sheathing given a coat of good paint. In soldering these sheets, rosin, and not acid, should be used, as the latter may find an opening in the tin coat and attack and destroy the body.

Where tin plate is used for roofing it should be with flat seam secret nailing for flat or less than eighth pitch roofs. For those of greater pitch than this a standing seam secret nailing may be used, care being taken that seam is not carried into the gutter, where it would interfere with drainage and also be a possible cause of leaks through water making its way into the seams. The tin strips for this should be painted before application.

Clay Tile roofs of exceedingly handsome appearance may be obtained by the use of clay tile, which is manufactured in various interlocking shapes varying from flat roof tile, in red or green coloring, to Spanish tile, which offers a rich æsthetic effect and is particularly favored for use with exterior walls of stucco or face brick.

In selecting a roofing of terra cotta tile, great care must be exercised in choosing only the product of a reputable manufacturer. Clay tile properly made and carefully laid forms a permanent and beautiful fire-resistive roofing.

Within the past few years many communities having tile roofs exclusively have sprung up. Here the combination of the warm colorings of tile, together with properly tinted stucco or well-chosen face brick, combines to produce an æsthetic effect which leaves nothing to be desired.

Gypsum.—As a roofing material, gypsum in the form of tile is used on large buildings having flat roofs or slight slope. This product, while not available in tile or shingle form for dwellings, has an interesting use in reducing the hazard of the wood shingle roof. Here a layer of gypsum plaster board is nailed on the roof boards underneath the wood shingles and will act as an excellent fire retardant in case of fire communicated to the wood shingles.

Metal Tile.—This roofing is of the shingle type, made in a variety of forms for the purpose of preventing leakage and to resist wind-pressure. The materials used are sheet copper, tin, galvanized iron, terne plates and other metals. Photographs herewith show different types of metal tile. Cost, $6.50 to $15 a square.

Weights run about as follows: terne plates, 110 pounds; galvanized steel, 125 pounds; copper, 140 pounds. This type of shingle can be obtained in graduated forms for use on circular roofs, domes, turrets, towers and other conical surfaces, and present an excellent appearance coupled with safety against the brand hazard. The cost is reasonable.

Asphalt Shingles.—Well made asphalt shingles form an excellent fire-retarding roof covering. This shingle is usually composed of a flexible body of fibrous felt which has been permeated with hot asphalt as a preservative and waterproofing medium. The wearing surface is faced with crushed slate or rock forced in under heavy pressure.

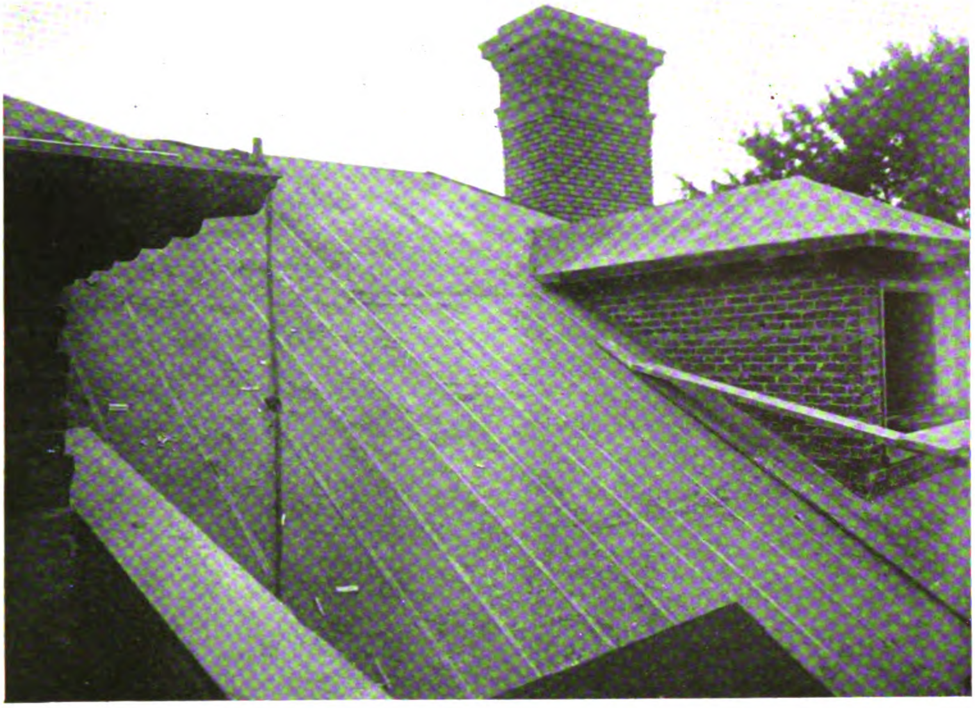
The cost of asphalt shingles runs from $4.50 to $6 per square and the average weight is 200 pounds to the square. The stone or slate surface of these shingles is practically proof against the flying brand hazard and their use in place of wood shingles does not mean an increase in roofing cost. The color effect obtained from the use of crushed red and green slate is excellent. Ready roofing shipped in rolls and applied in strips is also made in a similar manner.

Fireproofing Wood Shingles

There are several firms which are endeavoring to develop a material for the treatment of roof shingles that will not only make them really fire-retardant, but at the same time increase their life. Naturally, if a material of this kind can be produced that will have the approval of the Underwriters' Laboratories and the Board of Fire Underwriters it will be of great benefit to the building industry, and, as it seems more than probable that such a material will be out in the near future, such material should have the approval of the Underwriters' Laboratories or National Board of Fire Underwriters before any consideration is given to it, for otherwise the claims for some of the *so-called* fire-retardant material might be accepted as facts, with the result that property owners would pay for a fire-retardant roof without having any protection beyond what an ordinary wooden shingle would give.

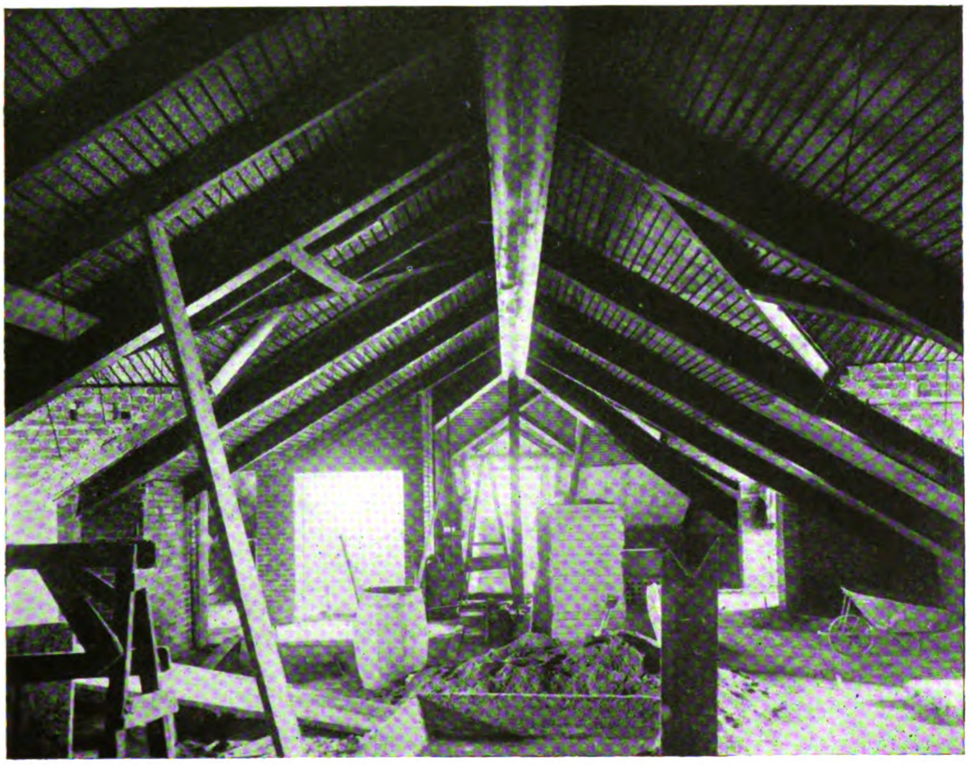
In connection with the subject of the fireproofing of wooden shingles, considerable publicity has recently been given to the idea of a cement coating to wooden shingles to make them fireproof, the cement coating being mixed with skim milk instead of water.

That this is not a practicable method of rendering a wood shingled roof fire-safe, is evidenced by the following letter to the Editor, the publication of which will help to offset the effect of misleading statements which have recently been made regarding the attitude of the cement interests toward this unsatisfactory



Courtesy of General Fireproofing Co.

Two interesting views showing construction of concrete roof. This construction and reinforcing is described in the text of this article



method of making wooden shingles safer. Following is the letter:

Editor CONSTRVCTION: AUGUST 28, 1916.

"The writer has had his attention called to an item now making the rounds of papers devoted to the building interests, to the effect that he is advocating the use of a cement coating for wooden shingles to make them fire retardant, this cement coating being mixed with skim milk instead of water.

"A person reading the item would infer that since the writer's position is mentioned, that this is a move upon the part of the cement companies to increase the sale of cement. The writer wishes to state that there is no truth whatever in the report, and he is doing what he can to have editors make a correction.

"The writer is opposed to the use of wooden shingles for reasons that are already known to every man who advocates fireproof construction.

"Franklin Wentworth, secretary of the National Fire Protection Association, made a speech in Chicago a couple of months ago condemning the use of wooden shingles. Mr. Kellogg, secretary of the National Lumber Manufacturers' Association, wrote a letter to Mr. Wentworth, and Mr. Wentworth, in replying, sent him a clipping from some newspaper in which a coating of cement was advocated for the protection of wooden shingles. Mr. Kellogg asked the writer's opinion of this matter, and the writer informed him that the painted shingles rot very quickly because the surplus paint formed a dam below the butt edge of the shingle, which held back water and forced it under the shingle. He also stated that if cement and sand are mixed with water, the wooden shingles will absorb the water and the sand and cement will blow away. He added, however, the statement that if skim milk were used instead of water the paint would adhere, but that even in such a case it would not be very durable and would help destroy shingles for the reasons stated.

"The publicity bureau for the lumbermen thereupon made out an item, which was widely circulated throughout the United States, to the effect that the writer is advocating the use of a cement coating for wooden shingles.

"The writer would appreciate whatever publicity you can give this statement of his in order to counteract the effect of the false statement circulated so widely."

Yours truly,

ERNEST MCCULLOUGH,

Chief Engineer, Fire Proof Construction Bureau, Portland Cement Association.

The Cost Question

As remarked in the introduction to this article, the most short-sighted policy pursued by the American people to-day is that which tends toward sacrificing safety to cheapness in building construction. This statement is directed particularly to the individual.

If John Jones wishes to build a house he goes to an architect and tells him what his idea of a house is and how much he wants to spend. In planning the details the intelligent architect of to-day, who has come to realize the value of warding off the danger of fire, will advise Jones to build his house of fireproof materials and to put on one of the many styles of fire resisting roofing which are on the market. But Jones came from New England, or, for that matter, perhaps from New Mexico, where his father's home was roofed with wood shingles. Jones reads the newspapers, but he has become so accustomed to seeing several fire losses a day that he never stops to read the details, and so has never had reason to realize the danger of the shingle roof. Like many Americans, Jones has the shingle-roof habit, so he asks the architect how much less the actual cost of the roofing would be if he uses wood shingles in the place of those which are fire-resistive. The answer is probably a few dollars—and the result is another shingle roof.

Now for the real difference in cost.

Jones expects to live in that house for a number of years. His insurance rate is higher, and at the end of ten years he needs a new roof. Aside from the question of insurance and fire hazard, the wooden shingles which Jones' father used were better shingles than Jones can buy to-day. Shingles many years ago were split from the heart of straight-grained cypress or white pine butts, and made a roof covering which would last for forty years or more. It is almost impossible to obtain shingles of this kind now, and the cost is naturally high. The shingles that Jones bought were made from sawn lumber—ready to curl, warp, twist or split under the action of the weather.

Good fire-resistive shingles will last twice as long as present-day wood shingles.

This is the ultimate cost without any consideration of Jones' criminal negligence in housing his family in a fire-trap, or the burden of additional conflagration hazard which he imposes upon his community.

In the matter of cost let us consider how far the insurance saving will go toward eliminating apparent additional cost of good fire-resistive shingles.

The average penalty, or additional charge where wood shingles are used, has been shown to run from 5 to 25 cents on each $100 of insurance.

Thus, at an average increase of 15 cents the total excess for a house valued at $10,000 is $15 a year, or, taking advantage of the customary five-year policy at four-year cost, $60 additional insurance in five years. Then, too, there is an additional contents charge.

Clearly the difference in insurance cost would soon pay for unburnable roofing.

. . .

The problem of the proper roofing of the home has here been presented and its solution offered in a manner which has endeavored always to be fair and open in the presentation of facts, always keeping the best interests of the home-builders foremost in mind. The best advice that can be given is to avoid all types of burnable and over-cheap roofing. The merits of the different types of firesafe roofings described in this article are, of course, left to the judgment of the purchaser. If there was not a good demand for every type such types would not be offered for sale. Each has its peculiar merits and adaptability—the pocketbook will often govern in the final selection—but, above all, each type has the merit of being proof against the hazard of flying brands and sparks, and its use has overcome to a great extent the danger of the loss of the home by fire. So in the years to come, as the everyday man uses common sense in the selection of firesafe materials with which to cover the exterior of his home, will the vast annual fire waste be materially reduced.

Fire prevention, even as charity, should begin at home.

Incombustible Lathing Material

By Virgil G. Marani
Consulting Engineer, M. Am. Soc. C. E.

THE use of incombustible lath as a base for finished plastering surfaces is becoming general, especially so since the benefits of this type of construction are better known and more fully appreciated by the practical builder and owner.

My reason for so strongly advocating incombustible lath is based upon the common knowledge that more than 99 *per cent of the building operations in the United States are of combustible construction*, and insurance statistics show that about nine-tenths of the fires originate within the buildings. Since these are undisputed facts, and since combustible buildings will (for economic and similar reasons) be the prevalent type of construction, it is important that those responsible for the adoption of building ordinances use their efforts to have embodied herein sufficient regulations governing this 99 per cent of combustible construction, so that this type of building will be more permanent, less of a fire hazard to occupants or adjoining property, and will (by the nature of such protective constructive features) contribute less than heretofore to the sum total of the present appalling annual fire waste of this country, which is about $250,000,000.00, and at periods has exceeded $2.50 for

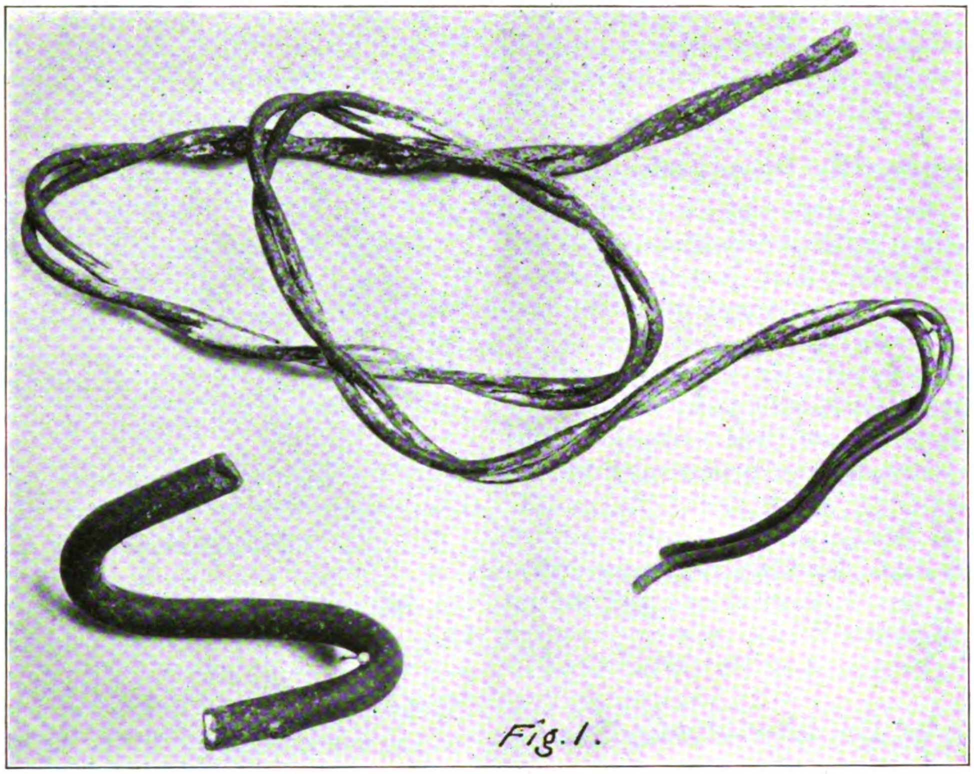


Figure 1, showing the condition of the steel reinforcement which was imbedded in gypsum plaster for over 15 years. The pieces illustrated are the "S" hook, which was not protected by paint or galvanized coating, though the twisted wires were galvanized. The pouring of a gypsum floor requires much more water than is used in any plastering operations, and naturally takes longer to dry. The specimen photographed was therefore subject to conditions favoring corrosion.

every man, woman and child constituting the entire population (see "Fire Protection," January, 1916, "Fire Loss vs. Poor Construction").

Every kind of *incombustible lath* of "approved" materials and make should be allotted its proper place in building code legislation, and the use of such accepted lath should be encouraged by allowing buildings so lathed greater privileges of height, area and use than would be the case if these structures did not include the temporary fire protection obtained by the use of *incombustible lath*, and a fire-resisting plaster.

It is perfectly obvious that the greater the amount of incombustible material that can be introduced to replace combustible construction the better. *Incombustible solid lath* renders very appreciable and effective "fire resistance" to any wood construction with which it is in contact, for it provides protection in addition to the protection obtained from the additional coat of half an inch or more of "fire-resistive" gypsum plaster, sometimes called "hard plaster." (See "Fire Engineer," April, 1916, "Safer Combustible Buildings.")

Incombustible lath are of many kinds, in general practice usually consisting of various types of metal lath which might be termed "*Open Lath*," and incombustible boards or sheets, usually of asbestos composition or gypsum plaster, which might be termed "*solid lath*."

Incombustible Open Lath

Incombustible "open lath" must be of metal, its efficiency as a lathing material depending upon—

1. The plaster coating which protects the metal, filling all openings and constituting a uniformly fire-resistive plaster surface.
2. The gauge and weight per square yard of the metal, and the quality of its protective coating.
3. The stiffness of the lath (non-yielding), and the effectiveness of provisions for nailing, and for the plaster clinch.
4. Resistance to the transmission of heat and sound (before and after the application of the plaster coat.)
5. Economy as regards erection cost and the required quantity of plaster to adequately cover a given surface.

The Question of Corrosion of Metal Lath

Outside or Inside Work

Since in practically all of the metal lath construction throughout the country the plaster covering most used is gypsum plaster, it is important to inquire as to the corrosive effect (if any) of gypsum upon metal. The fact that gypsum plaster is the Di-hydrate of Calcium Sulphate (chemically expressed—$CaSO_4 2H_2O$) has probably led to the erroneous conclusion that the sulphur compound of gypsum would make this plaster less desirable for use upon metal lath because of the chances of corrosive action of sulphur upon iron or steel.

Doctor W. F. Hillebrand, U. S. Bureau of Standards, in answer to this question stated:

"It is incorrect to speak of a 'sulphuric acid content of gypsum.' The properties of sulphuric acid are lost when the acid is fully neutralized, as in gypsum."

The July, 1914, number of "Concrete Cement Age" contains a progress report by J. C. Pearson, assistant Physicist of the U. S. Bureau of Standards, Washington, D. C.

This report contains the findings of the Government on the result of elaborate tests upon various plasters applied to different forms of metal lath, the constructions being subjected to the many varying conditions of dampness, etc., usually found in practice. The substance of this progress report to date indicates that—

The corrosive action when using gypsum plasters is less vigorous than might be anticipated. Assuming the rating 10 as indicating *perfect condition, no rust*, the following was found:

On painted "special" iron lath gypsum plaster rating averaged 9.0; average rating of all plasters, 9.3.

On painted steel lath gypsum plaster rating averaged 9.0; average rating of all plasters, 9.1.

On sherardized lath gypsum plaster rating averaged 7.5; average rating of all plasters, 8.3.

On unpainted "special" iron lath gypsum plaster rating averaged 7.25; average rating of all plasters, 7.00.

On plain steel lath gypsum plaster rating averaged 7.5; average rating of all plasters, 7.6.

In the year 1911 the sub-committee on engineering subjects of the Joint Committee of City Departments of New York City, while investigating the subject of corrosion, caused the cutting into of a gypsum floor slab in the roofing and upper floor system of Hammerstein's Victoria Theater, Seventh avenue and Forty-second street, New York City, for the purpose of examining the imbedded steel. Both the twisted wire cables and the I beams showed only initial rusting and that the rusting had not progressed, the committee being favorably impressed with the condition of the steel. (See Figure 1 on preceding page.)

Subsequently, in the summer of 1915, this theater building was torn down. "S" hooks, which were used as anchors for the reinforcing cables, though not previously coated in any manner, showed no signs of progressive corrosion, the same being true of the galvanized, twisted cables. The accompanying illustration shows this hook and a section of the cables as they were taken from the building. (This matter will be found carefully set forth in an affidavit made by Samuel G. Webb, and registered Bronx County, No. 4, Bronx Register, No. 606. Certificate filed in New York County, No. 11, New York, Register No. 6036.)

From information gathered, thus far, it is very evident that when air and moisture are prevented from coming into contact with the imbedded metal lath, *appreciable, damaging, or progressive corrosion does not occur.*

Any possible progressive corrosion of the metal lath can be prevented by completely imbedding the metal lath in a sufficient thickness of Portland cement, gypsum or lime plaster, and when this is not feasible the metal lath should be coated with a protective coating of galvanizing, or be painted, dipped or treated with non-corrosive pigment.

Fire Resistance

Metal lath and gypsum or lime plaster cannot be considered as being "fireproof," though this combination constitutes an excellent "fire resistive" or incombustible construction.

It is evident that metal lath in itself, being open, is of no value as a fire resistant, and that its value as such depends entirely upon the quality and quantity of "fire resistive" plaster with which it is covered, the completed construction forming the blanket or curtain (in the form of a ceiling or partition), which for an appreciable time will effectually withstand and prevent the passage of fire.

As a plastering material upon metal lath gypsum plaster is most used, because of its economy, ease of application, quick setting, strength, fire resistance, low expansion and conductivity of heat. These necessary conditions are not combined in any other commonly used plastering material. After the Bacon Department Store fire, 2175-2193 Washington street, Boston, Mass., January 14th, 1914, the only portion not consumed was the entire elevator shaft, three stories and an attic high. This construction, which stood intact and practically uninjured, consisted of metal lath upon steel channels, and was plastered solid to two inches thick with gypsum plaster. (See "Metal Lath Handbook," 1915.)

Striking tests have been made upon metal lath and steel stud construction plastered to a solid thickness of 2½ inches, with a plaster composed of one part of Portland cement, 1/10 part of hydrated lime, and 2½ parts of clean, sharp sand by volume.

A construction of this nature, tested at the Columbia University Testing Station, Brooklyn, N. Y., July 17th, 1914, passed a fire test of 1,700 degrees Fah. for three hours, with the subsequent application of water. In this construction all materials and details of erection were ideal, the plaster coats being applied in no less than seven applications.

The question of heat conductivity is of particular importance where metal lath is applied to wood joists or studs. The metal lath, being in close contact with the wood, prevents to some degree, as full, deep or strong a clinch at this point as elsewhere, consequently this portion of the construction (at the wood framing) has the least plaster protection, where as a matter of fact it should have the most. Metal lath should not be in contact with any woodwork where fire resistive construction is desired.

Incombustible Solid Lath

The use of gypsum plaster board as a lathing material will be discussed at greater length than metal lath, since the possibilities in the use of this form of lath are imperfectly understood.

Incombustible "solid lath" consist of gypsum plaster, or asbestos composition boards, and should not be confused with substitutes for lath and plaster which are sold in the form of panel or wall boards, *to be used without plaster*, and are composed of paper or pulp, pressed combustible materials, and veneered inflammable compositions, all of which are *not incombustible*, but are combustible, and when exposed to fire will support combustion and flame.

The efficiency of incombustible gypsum "solid lath" as a lathing material depends upon—

1. The additional advantage of ½ inch or more of gypsum "fire resisting" plaster, which has the same incombustible qualities as the solid incombustible lath to which it is applied.
2. The thickness and toughness of the board and its freedom from warping, either before or after erection.
3. The strength of the board required to resist the plasterers' operations, and the nature of surface which will form the base for the plaster to adhere to (viz., plaster bond or clinch).

Adaptability to receive the required nails without splitting, and sufficient fibrous binding material to constitute a good nail hold.

4. Resistance to the transmission of heat and sound (before and after the application of the plaster coat).
5. Economy as regards erection cost, and the required quantity of plaster to adequately cover a given surface.

The Question of Corrosion of Plaster Board

In the case of gypsum or asbestos board lath there is, of course, no question of corrosion, and for this reason plaster board lath has, in some instances, been used upon the outside of wood frame buildings for exterior stucco, many of these buildings being still in perfect condition.

In some cases trouble occurred from the cracking or falling apart of the outside stucco, which was due to insufficient covering, and also because this stucco, not being waterproofed, contributed largely to the weakening of the gypsum board and stucco bond from incessant moisture. These conditions would, in time, also

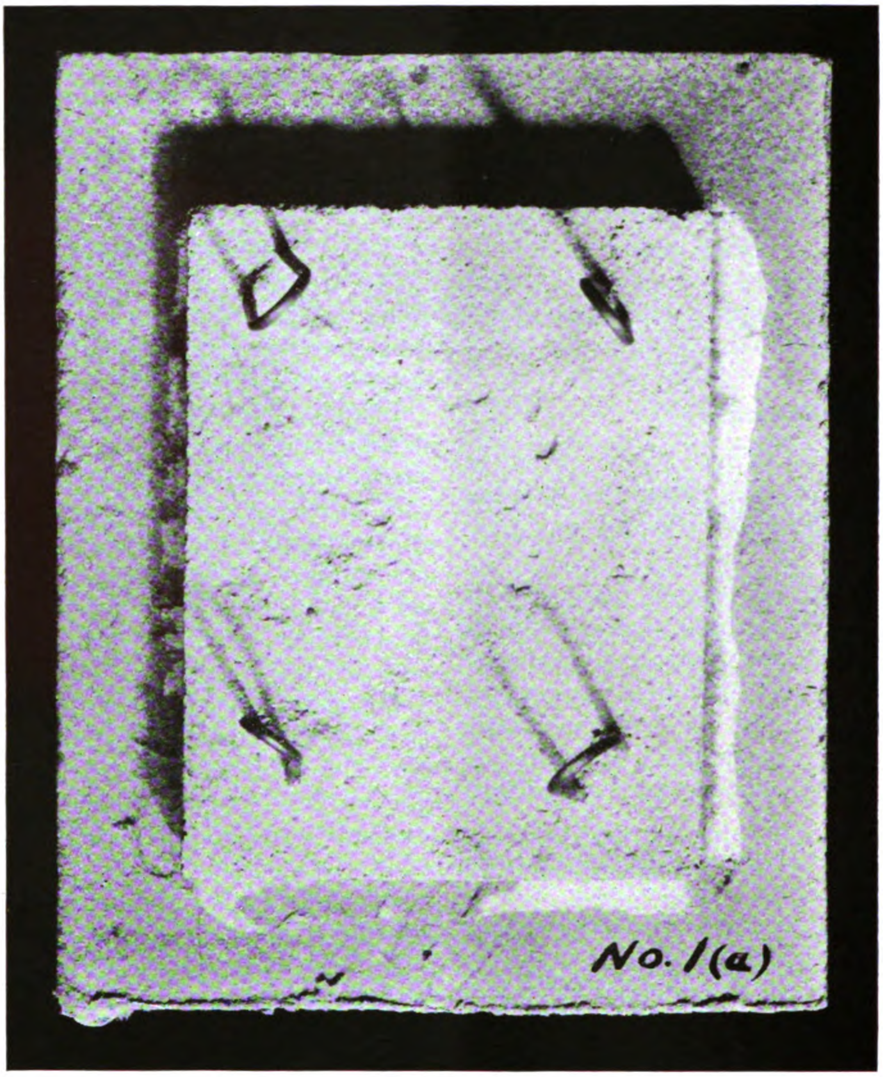


Fig. 1 (a). (Before test)

Illustrations Nos. 1 (*a*) *and* 1 (*b*)

Gypsum plaster board lath	⅜	inch thick
Area of plaster board lath (5″ x 4″)	20	square inches
Area of plaster coat (3⅜″ x 2 11/16″)	9.03	square inches
Thickness of plaster coat	½	inch
Total load to produce parting of plaster coat from plaster board	145	lbs.
Total load at rupture, per square inch	16.05	lbs.
Factor of safety, assuming weight of ½″ plaster coat at 3 lbs. per sq. ft. (approx.)	800	

NOTE.—The gypsum plaster board of this test consisted of four layers of wool felt binder and three intermediate layers of gypsum, each about 3/32 of an inch in thickness, making up the full thickness of the board. The rupture was in the parting of the wool felt binder itself, the plaster board and plaster coat remaining uninjured. (See illustration on opposite page.)

have caused similar failure to metal lath from consequent progressive corrosion.

Inside Work

Gypsum plaster board is used extensively in the interior of buildings as a lathing material for walls and ceilings. In fireproof buildings, since the completed construction must be entirely incombustible, the plaster boards are secured by metal clips, or similar means, to metal studs for partitions, and to metal hangers for suspended ceiling. The "Jester-Sackett," "Sprague" and "Burson" systems being the most frequently used.

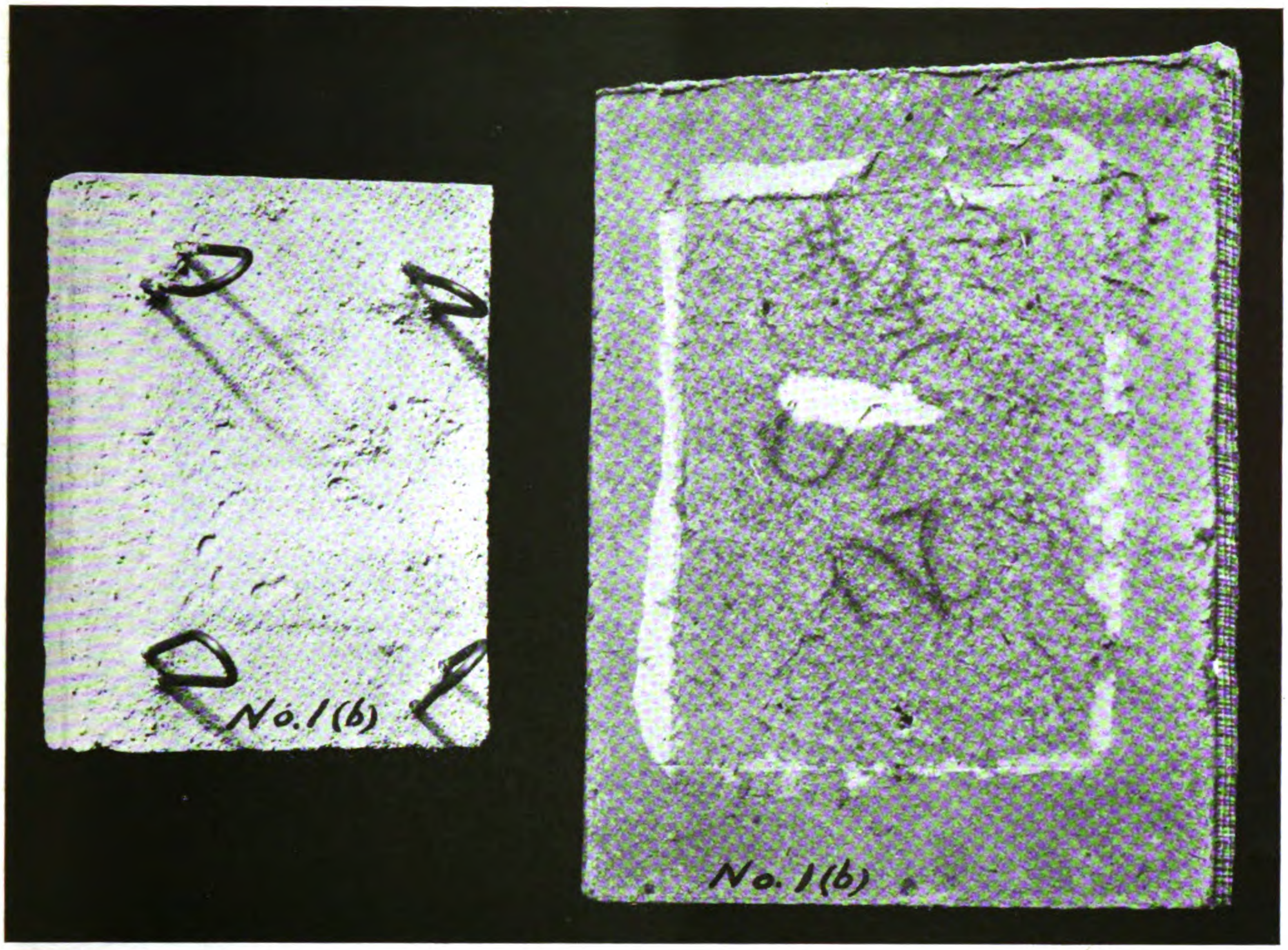


Fig. 1 (b). (After test)

One type of solid incombustible partition, which has met favor with architects and engineers on account of its economy, quick erection and high fire resistance, consists of solid gypsum plaster board lath, secured to ¾-inch channel studs with metal clips, and plastered on each side to a finished thickness of about 2 inches, the plaster covers and protects all of the metal studs and clips used in the construction. Small conduits, pipes and wires can be completely buried in this thickness of partition.

In cases where a hollow incombustible partition is desired, the plaster board lath is secured by metal clips to each side of the stud, leaving a hollow space the width of the stud between, the outside surfaces being plastered to suitable grounds. Single channels are used up to the 2-inch size, making the outside dimensions of the finished partitions 2½ inches, 3 inches, 3½ inches and 4 inches. For partitions of a finished thickness of 5 inches and 6 inches usually two ¾-inch channel studs, properly spaced, are used.

Suspended ceilings of gypsum plaster board lath secured to a suitable steel channel framework by metal clips are frequently used in fireproof buildings. In buildings of concrete joist construction the same material can be used in the form of an incombustible soffit ceiling, the plaster board lath being secured to metal clips, which are placed in the forms before the concrete beams are poured, and serve the dual purpose of a spacer for the steel reinforcement and a means of attachment for the soffit lath or any incombustible suspended ceiling.

In ordinary wood frame construction these lath are, of course, nailed directly to the wood studs or joists.

Outside Work

Gypsum plaster board can be used in the same manner as metal lath for a plastering base for outside stucco, and can be made weather and waterproof by the proper application of waterproofing. One good method is applied under pressure in the form of a dense spray and in much the same manner as the cement gun process for concrete applications. The Union Products Company, Cleveland, Ohio, has used such a process (Par-Lock) with success, using two applications, the first being the waterproofing gum sprayed on, upon and into which is afterwards driven (by the same process) a coarse sand, the object of the sand being to provide a mechanical clutch or key for the stucco.

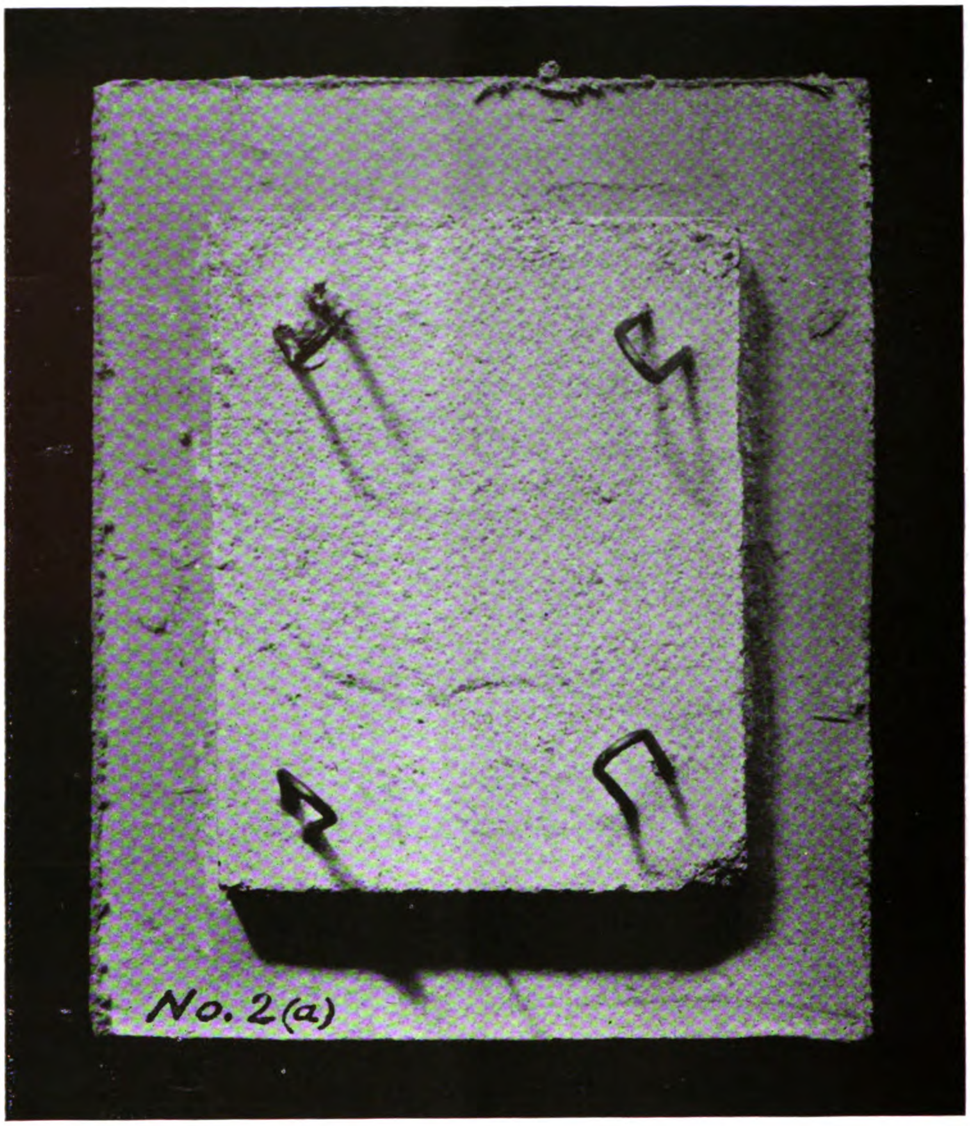


Fig. 2 (a). (Before test)

Illustrations Nos. 2 (a) and 2 (b)

Gypsum plaster board lath	⅜ inch thick
Area of plaster board lath (5″ x 4″)	20 square inches
Area of plaster coat (3 7/16″ x 2 11/16″)	9.19 square inches
Thickness of plaster coat	½ inch
Total load to produce parting of plaster coat from plaster board	115½ lbs.
Total load at rupture, per square inch	12.57 lbs.
Factor of safety, assuming weight of ½″ plaster coat at 3 lbs. per sq. ft. (approx.)	600

NOTE.—The gypsum plaster board of this test consisted of two layers smooth chip binder and one intermediate layer of gypsum, making up the full thickness of the board. The rupture was in the parting of the smooth chip binder itself, the plaster board and plaster coat remaining uninjured. (See illustration on opposite page.)

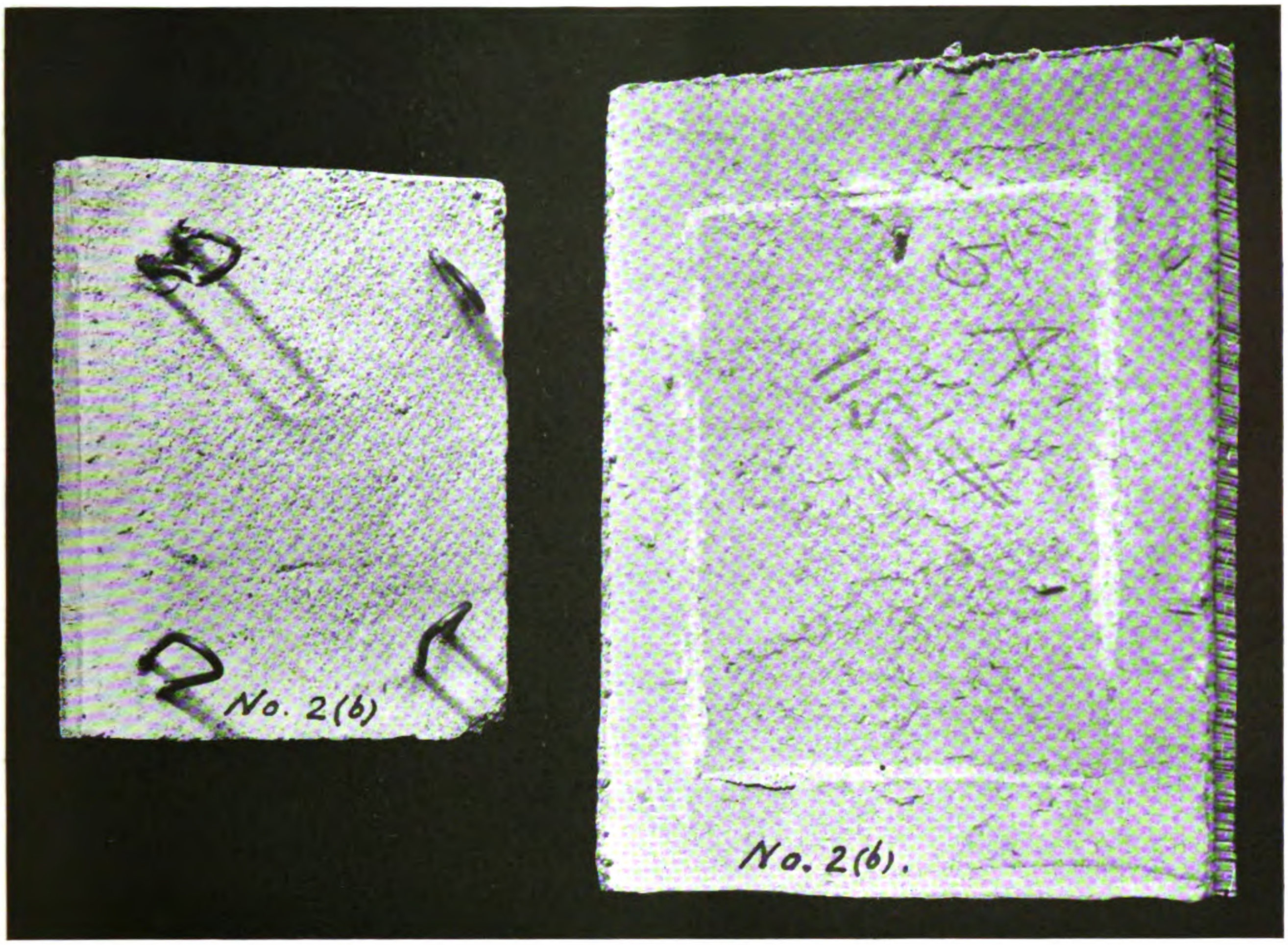


Fig. 2 (b). (After test)

The cost of a frame exterior per square foot using average Middle West prices is about as follows:

¾-inch sheathing, building paper, top siding, and painting two coats (labor and material), 15¾c.

While a frame building exterior of gypsum plaster boards covered with stucco can be erected for somewhat less than the following cost per square foot of surface:

Two (⅜-inch) gypsum plaster boards, joints staggered; surface "Par-Locked;" nails, and ¾-inch stucco with float finish, 15c.

The advantages of using gypsum plaster board sheathing, treated as suggested, cannot be overestimated. The finished construction makes buildings warmer in winter and cooler in summer, damp proof, and to a great extent will provide a very appreciable degree of "fire resistance" to the structure from outside fire hazards.

Strength

Quoting from a report submitted by the National Board of Fire Underwriters' Laboratories, July 23, 1910, the following tests were made upon gypsum plaster board manufactured by the United States Gypsum Company.

This particular type of plaster board was 32" x 36" and consisted of four layers of wool felt binder and three intermediate layers of gypsum, each 3/32 of an inch in thickness, the total thickness of the board being ⅜ of an inch and weighing about 2 pounds per square foot.

"The strength of the unplastered boards, both when saturated with water and when dry, was roughly investigated by subjecting pieces 10" wide and 14" long to a traverse test. The samples were supported on bearing edges set 12" apart, and the load applied through a bearing having contact the full width of the pieces. This bearing was set midway between the supports. The load was applied slowly and until the pieces failed.

The boards which were saturated for test were submerged in a tray of water at room temperature for 108 hours before testing, were permitted to drain for about 10 minutes and then tested to failure in the same manner as the normally dry samples.

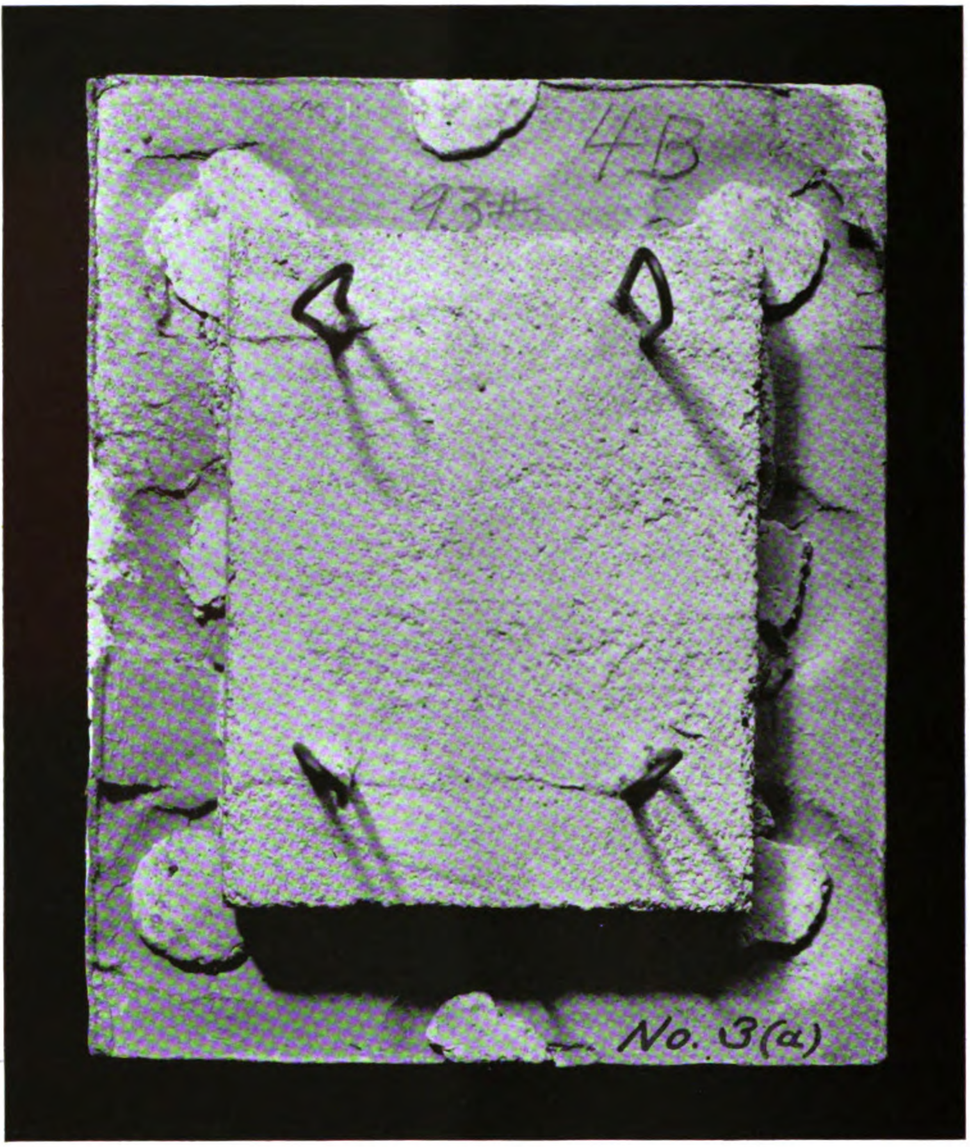


Fig. 3 (a). (Before test)

Illustrations Nos. 3 (a) and 3 (b)

Gypsum plaster board lath	⅜ inch thick
Area of plaster board lath (5" x 4")	20 square inches
Area of plaster coat (3 7/16" x 2 11/16")	9.19 square inches
Thickness of plaster coat	½ inch
Factor of safety, assuming weight of ¾" plaster coat at 3 lbs. per sq. ft. (approx.)	93 lbs.
Total load at rupture, per square inch	10.12 lbs.
Factor of safety, assuming weight of ½" plaster coat at 3 lbs. per sq. ft. (approx.)	500

NOTE.—The gypsum plaster board of this test consisted of two layers of smooth chip binder and one intermediate layer of gypsum, making up the full thickness of the board. The gypsum contained a small percentage of cut fibres.

In the manufacture of this plaster board the surface chip binding material was pressed into the gypsum so that the gypsum itself penetrated this covering, making spots of gypsum for the plaster coat to adhere to.

The rupture was in the parting of the plaster coat from these points, and the parting of the smooth chip binder. (See illustration on opposite page.)

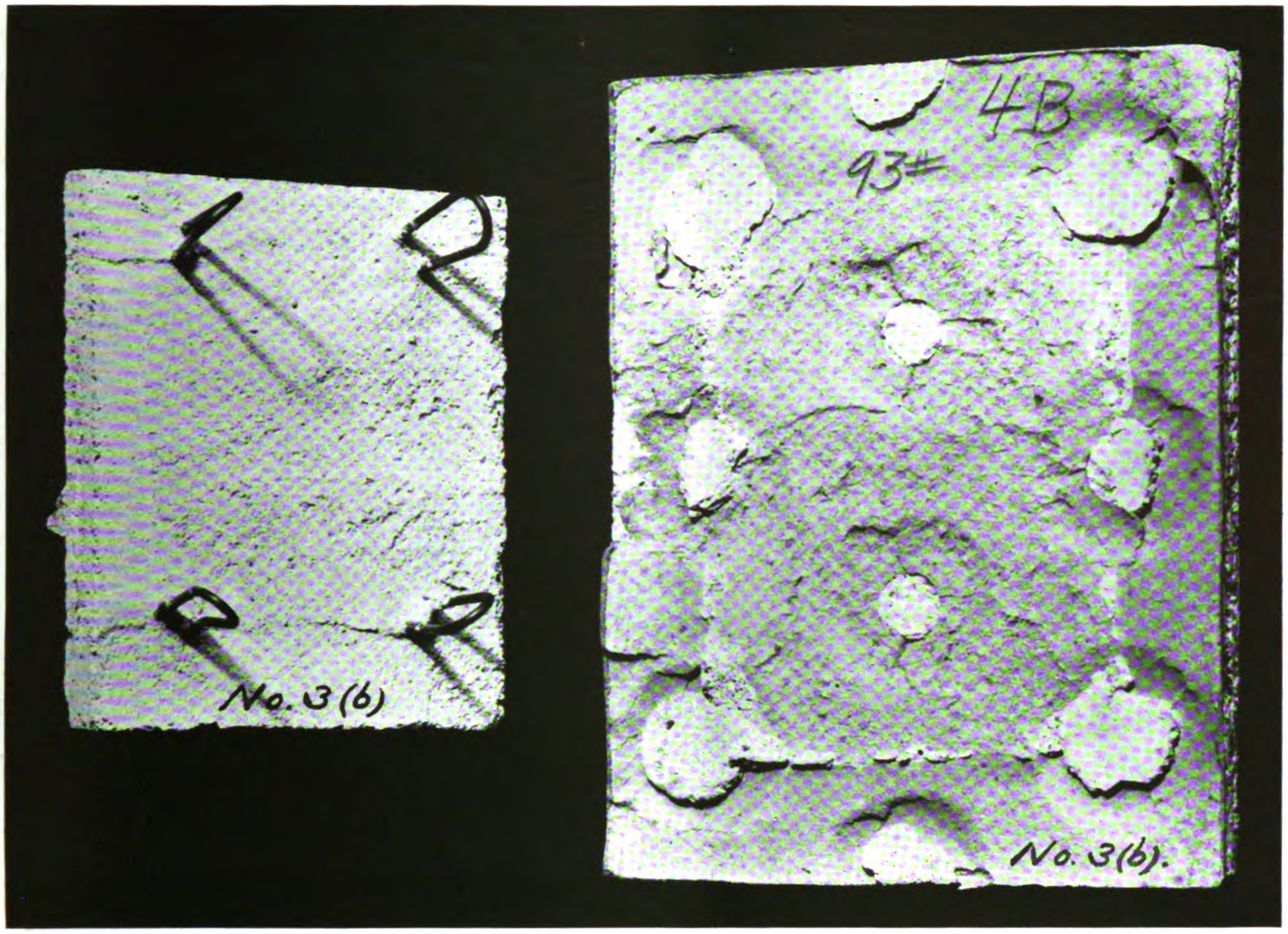


Fig. 3 (b). (After test)

Samples

Dry		Saturated	
No. 1	52.5 lbs.	No. 1	12.37 lbs.
No. 2	50.0 "	No. 2	15.67 "
No. 3	52.5 "	No. 3	11.48 "
Average	51.67 lbs.	Average	13.17 lbs.

NOTE.—The above would equal a uniformly distributed load in pounds per square foot of about 86 for dry, and 22 for wet boards.

It is interesting to note that the samples of plaster board which had been totally immersed in water for 108 hours, although weakened, retained more than sufficient strength to support any standard plaster covering.

Ultimate load tests upon plaster board plastered, made on February 16th, 1914, showed the following:

Dry	Saturated
204 lbs. per sq. ft.	62.5 lbs. per sq. ft.

Adhesion of Plaster to Plaster Board

The adhesion of plaster to gypsum plaster boards is one of the remarkable characteristics of this form of incombustible lath. Since the tenacity of this adhesion depends somewhat upon the character of the plastering surface, the following tests were made upon three kinds of typical and much-used gypsum plaster lath:

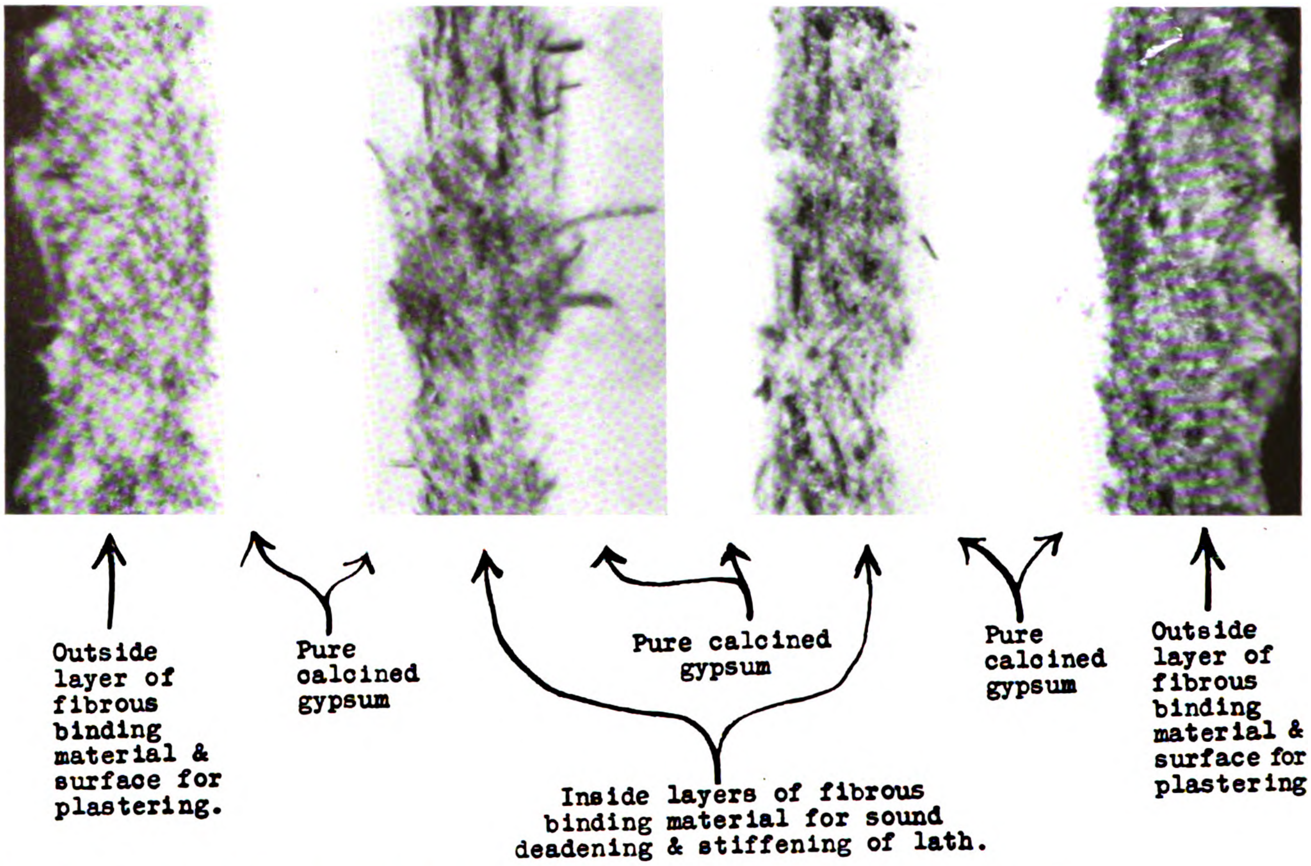
Gypsum plaster board samples about 5" x 4" were plastered with commercial sanded plaster, the plaster coat being ½ inch thick and approximately 3½" x 2½". Imbedded in this plaster coat were metal staples to which was supported the platform upon which the load was gradually applied till rupture took place.

It is interesting to note that the more porous wool felt binder, sample No. 1 (a), has the greater adhesion to the plaster coat, while in the case of the less porous and smooth chip binder sample No. 2 (a) this adhesion is somewhat reduced.

Sample No. 3 (a) illustrates a new type of plaster board, with a smooth chip binder surface, but manufactured in such a way that at regular intervals the gypsum composition of the interior is pressed through the paper, forming spots or buttons of gypsum for the plaster to adhere to, with the idea of overcoming the less effective adhesion of plaster of the chip binder surface.

Although, as shown by photograph No. 3 (b), the plaster surface engaged an area approximately equal to four of the gypsum spot surfaces, the results of this test are not as high as was expected.*

In my opinion, higher results could be obtained by testing upon a larger scale (viz., a greater plastered surface), and with a gypsum plaster in which there was no admixture of sand.


Outside layer of fibrous binding material & surface for plastering.
Pure calcined gypsum
Pure calcined gypsum
Pure calcined gypsum
Outside layer of fibrous binding material & surface for plastering
Inside layers of fibrous binding material for sound deadening & stiffening of lath.

NOTE—*In order to show all layers of magnified fibrous material, gypsum portions in between are greatly reduced in size.*

View of cross-section of gypsum plasterboard (magnified 200 diameters) showing impregnation of binding material by gypsum

The results given with the illustrations are the average of three tests, and offer conclusive evidence that the bond of plaster to a plaster board surface is ample.

Impregnation of Binding Materials

Considering the tenacity with which the gypsum plaster adhered to the plaster board surfaces, as evidenced by the illustrated tests, it is reasonable to assume that the binding materials used upon the surface of the board become more or less impregnated with the plastic and moist gypsum during the process of manufacture, and that this impregnation is likely to be more thorough when wool felt fibrous material is used, owing to its greater porosity.

This impregnation by gypsum also occurs to some extent when the wet plastering coat is applied, and serves two purposes, first in making the binding material incombustible, and second, in adding strength and largely forming a perfect contact of gypsum with the fibres of the binding material used.

The above photographs, magnified to 200 diameters, show impregnation of the binding material to be the case, the lighter shades, being the white gypsum, constituting the plaster board, and the darker shades the layers of wool felt fibrous binding material.

Fire Tests

Gypsum plaster board lath plastered cannot be considered as fireproof construction, though it is widely used and is justly regarded as a "fire resisting" and incombustible material of exceptional merit. When nailed to wooden stud or joist construction the complete contact of gypsum plaster board at the joists or studs, together with the gypsum plaster coating, affords a fire protection and insulation at these points not obtained by any form of open incombustible lath.

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* The test piece apparently only fully engaged two of the buttons, and the result of the test might be misleading for this reason, as if a larger area was covered engaging a number of the buttons it would probably increase the strength of adhesion.

Another point is that the mechanical clinch of the button to the plaster applied to the surface would probably serve as a means of mechanically holding the plaster in case of fire exposure, as the effect would doubtless be that even if the paper were charred the buttons would still serve to attach the plaster, even if calcined, to the surface, and prevent the plaster falling off.

It must be realized, however, that the paper cannot char as long as the process of calcination is taking place, because of the water of hydration which is being liberated. Also that the theory of the buttons is excellent when the board is plastered with unsanded gypsum, but as this is not standard practice, and since sanded plaster is always used for economic reasons, its greater expansion tends to rupture its contact from the plaster buttons, which are composed of pure gypsum and have a different co-efficient of expansion.—EDITOR.

The following authentic fire tests confirm what has been stated:

Prof. Charles L. Norton, Boston......February, 1900
Detroit Building Department ....June, 1904
Fire Department, Atchison, Kansas.......April, 1908
Portland (Oregon) Building Department..June, 1911
Industrial Board, Dept. of Labor, N. Y....Nov., 1914

Sound Tests

The value of gypsum plaster board as a deadener or retardant of sound has been demonstrated in a test made June, 1914, by Mr. Philip B. Woodworth, Professor of Engineering at Lewis Institute, Chicago. In this particular case a plaster board partition was tested in comparison with a wood lath partition, and was found to be about 3½ times more soundproof.

In each case the construction was standard, and plastered to the same grounds. The plaster board used contained four laminations or sheets of the wool felt fibrous binding material, this feature no doubt adding materially in obstructing the passage of sound.

Professor Charles L. Norton, in a comparative sound test made upon various types of partition construction (March, 1902) found the following:

"After much consideration, the writer (Prof. C. L. Norton), has given the following ratings to the various partitions, the order of their standing upon the list indicating their efficiency as compared with those above and below them.

No.	Room.	Side.	Rating.	Composition.
1	E	Left	100,	Cabot's Quilt, 3 thicknesses on metal lath.
2	E	Right	95,	Cabot's Quilt, 3 thicknesses on metal lath.
3	E	Rear	95,	Cabot's Quilt, 3 thicknesses on metal lath.
4	C	Rear	85,	Sackett Board, felt on channel studs.
5	C	Left	85,	Sackett Board, felt on channel studs.
6	C	Right	80,	Sackett Board on channel studs.
7	D	Rear	75,	Metal Lath and paper.
8	D	Right	75,	Metal Lath, paper and felt.
9	E	Right	60,	2-2" Keystone Block, with 2" air space.
10	A	Rear	50,	4" National Terra Cotta blocks.
11	B	Rear	50,	3" Keystone Blocks.
12	A	Right	45,	3" National Terra Cotta Blocks.
13	B	Left	40,	2" Keystone Blocks.
14	A	Left	40,	2" National Terra Cotta Blocks.
15	D	Left	30,	2" Metal Lath, solid plaster.

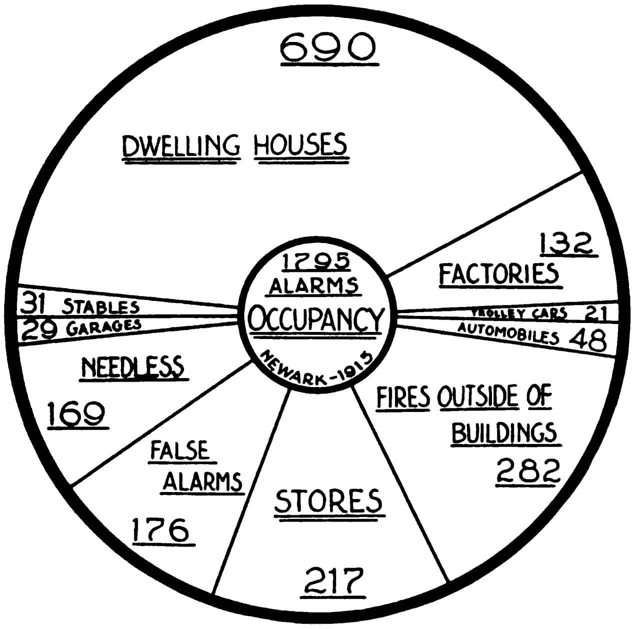
Nothing more is to be inferred from the numerical efficiency than that the first partition is about three times as good as the last, and that the numerical interval between any two partitions on the list merely indicates the order of magnitude of the difference between the partitions.

The partitions making up the rooms submitted by Samuel Cabot and the Sackett Wall Board Company were the most efficient, but it is distinctly to be borne in mind that no other room had so easy a test as did these. Each of the others had one thin and ineffective side which transmitted sound to the sides adjacent to it. The thin side of the Keystone Room was noticeably resonant and plainly rendered it impossible to make a fully satisfactory test of the air space partition. The solid metal lath plaster partition of the room submitted by J. Russell & Co. acted in the same way in that room.

I do not believe, however, that this defect in the structures has caused any change in the position on the efficiency list of the Cabot and Sackett Rooms."

Fire Statistics Graphically Shown

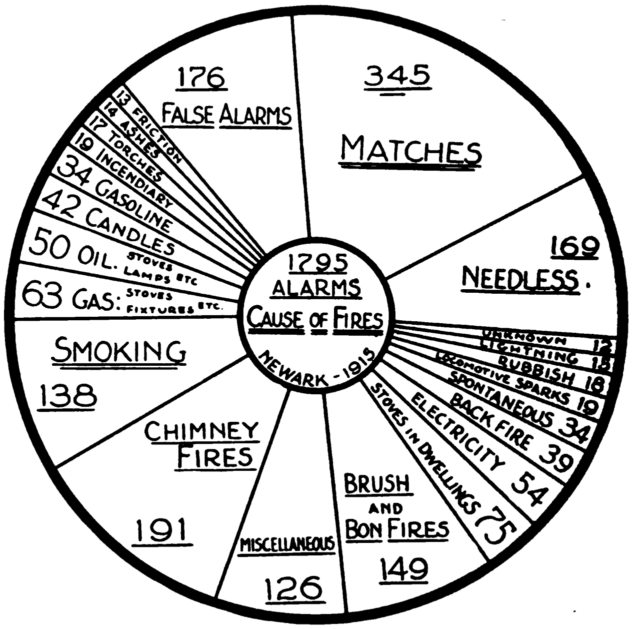
TO arouse interest on the part of the citizens of Newark, N. J., in the annual fire waste of their home community, and to secure their intelligent and hearty co-operation in the adoption and enforcement of measures that will make for greater safety from fire, C. Albert Gasser, chief of the Bureau of Combustibles and Fire Risks, of Newark, has prepared a series of charts presenting in graphic form the fire statistics of the city for the past year. Submitted in this manner, the figures compel attention, and, it is expected, will have an influence not obtainable under the conventional form of report presentation.



Among the interesting and important facts diagramatically portrayed by Chief Gasser are the following: Number of alarms of fires during 1915, arranged by months; number of Fourth of July accidents each year since 1907; alarms of fires according to wards; alarms of fires according to occupancy of properties; causes of fires according to construction of buildings.

Aside from its general interest, the data thus submitted is of distinct value to architects, builders, insurance men, property-owners and all others having a vital concern in reducing the fire waste.

We present herewith reproductions of two of Mr. Gasser's diagrams, which are typical of the series, and strongly recommend that the fire chiefs of other communities in presenting future reports to their respective communities, follow in general the methods of the enterprising head of Newark's Bureau of Combustibles and Fire Risks.



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Sues for Cost of Fire Extinguishment

Property-owners in New York City who disregard the orders of the Fire Prevention Bureau looking to the safeguarding of their premises from fire do so at their peril, the responsible officials being determined to hold all such to strict accountability.

In keeping with this program the Fire Department, a short time ago, brought suit against the owner of a warehouse to recover several thousand dollars, the cost of extinguishing a severe fire in the property. Fire Chief Kenlon reported that if there had been shutters on the windows of the warehouse, or a division fire wall in the premises, both of which had been ordered, the blaze would have been a trivial one.

Compelling individuals to pay the costs of extinguishing fires originating in their properties seems a drastic proceeding, and yet where the fire can be shown to have resulted from easily preventable causes, and especially when its spread results from ignoring fire-prevention ordinances, the justice of the statute cannot be questioned.

Several vigorous prosecutions similar to that newly instituted by the Fire Department would go a long way to reducing the loss record of New York City, which proves such a severe drain to the people of the metropolis.

Fire Prevention in School Buildings

By Chief Wm. A. Guerin

Organizer and former Head of the Fire Prevention Bureau of the City of New York; Chairman of the Fire Prevention Bureau of the Safety First Federation of America

Chief Guerin

EVERY day of the school year a school house burns in the United States.

This is broadly speaking, but it is generally true, and it is a terrible indictment of the wasteful methods of construction which are followed in the United States.

School authorities in the United States seem to dream on, unconscious of the advances which have been made in building construction in the last generation. School houses are built to-day just as they were built fifty years ago. They are invitations to fire and fire frequently—too frequently—accepts the invitation. Then comes the panic—with its toll of life—and another horror is added to the school list!

It seems as if those responsible for the safety of the children never would be aroused to their responsibility. It would also seem that they deliberately kept their eyes closed and refused to realize what was going on while they slumbered.

Fire prevention is not a new subject. It has been discussed from every angle—by everybody, in fact. Broadsides have been written on the subject, but notwithstanding the people of the United States seem to have no conception of the duties which they owe to "their country, their neighbors or themselves."

The trouble seems to be that we have suffered too much prosperity. It has made us careless. We live so fast and run on the high speed so much that we have fallen into ways of carelessness that have become well-nigh criminal.

Something must be done. What is it? Others may have their remedies, but my idea is that the real remedy is to teach fire prevention in the public schools. It should be part of the regular course, and should be considered as important as any of the three R's.

It is only necessary for us to turn back a very few pages in the book of time for us to recall the price we have paid for our ignorance. On the 28th of October, 1915, at 9 o'clock in the morning, fire was discovered in the basement of the St. John's Parochial School, at Peabody, Mass. The school consisted of 17 sisters in charge and 672 pupils. Of these, 300 were on the first floor, 260 on the second floor and 112 on the third floor.

The fire was discovered within a few minutes after it started, and the bell was immediately rung for a fire drill. On the way out one of the children tumbled and fell on the stairs. Just how it happened we do not know; but this we do know, that when the fire was out 19 burned and blackened little bodies were found in a heap at this point.

The frightful Collinwood, Ohio, fire in 1908 was started by a steam pipe igniting a wooden joist on which it rested. Hundreds of lives were lost at this fire.

The fifty-thousand-dollar chemical laboratory of Williams College was burned last December. The main hall of Washington College was wrecked last January. In this last fire many historic documents, some in the hand writing of George Washington, were swept up in smoke. On March 4th the engineering building of the Michigan Agricultural College at East Lansing was destroyed. In January the Chicopee High School went up in smoke at a cost of $225,000. This list might be carried endlessly.

Constant Vigilance Required

Where are we getting to? Something must be done!

The question of safe school houses begins with the drawing of the plans, and it never ends. It certainly should be illegal to put up any building in which children are to attend school unless that building is as nearly fireproof as science can make it. This is especially true where the building is more than one-story above the ground. The high price of land makes it, of course, practically impossible to build one-story schools in the large cities, but in the rural districts this is no excuse for constructing non-fireproof buildings.

Ninety-six per cent of all school fires start in the basement. This would seem to simplify the problem. The basement should be isolated from the rest of the building by fireproof ceiling, floors and doors.

There should be installed, also, in the basement of every school building, old or new, where the building is more than one-story high, an automatic sprinkler system.

Stairways should be ample in number and have a minimum horizontal length of travel from all the rooms with adequate exits at the street or ground level.

Stairways, however, should not be more than 5 feet wide, having hand-rails on both sides. If the stairway is wider it should have a central hand-rail.

Outside fire escapes should be permitted only as a last resort where it is impossible to provide adequate inside stair facilities. These inside stairs should be, however, completely walled off from the rest of the building, and should be separated by fireproof doors, making a fireproof well, down which the stairs should go. The trouble with the outdoor fire escape is that in winter it becomes covered with snow and ice, which makes them impassable or very dangerous.

Construction, of course, should be entirely of brick, or other fire-resisting material. Floors should be of concrete and all glass should be wired. In short, the building should be built along the most approved fireproof lines. Nothing else—nothing short of that—can possibly answer.

Protecting Old Buildings

These rules, of course, apply to new buildings, but there are thousands of old school buildings which must be used and which must be reckoned with. These, however, can be easily placed in far safer condition if those who are responsible will only give heed to the warning that these holocausts give.

All closets should be lined with metal and the doors also should be covered with metal. No rubbish or waste paper should be allowed to collect in closets or near stairways. Waste of this kind should be placed in metal receptacles to be emptied daily.

Doors to all stairways should be covered with metal and should be made self-closing. They should not be fastened back during the school sessions. All wooden partitions in basement should be covered with metal sheeting. The same action should be taken in corridors through which the children pass to reach stairway.

Heaters in the basement should be enclosed with metal and be contained in a room with a self-closing door, which should remain closed. It is better if this door can open to the outside air.

On every floor there should be gongs to announce the location of a fire, and the signal should be so arranged that the teachers will understand whether it is really a fire or simply a fire drill. These gongs should also be connected with the fire alarm of the city, so that when there is a real fire the alarm will be turned in at the same time as it is given in the school.

The janitor of the school, or a fireman, should be present in the building during the school session, and should visit at least once in every thirty minutes all parts of the building in which a fire might be expected to start.

The use of oil of any kind on wooden floors should be absolutely forbidden in the school building. There is no reason for its use, and it adds greatly to the danger.

Fire drills are excellent, but they are not always satisfactory. The Peabody fire was an example. The children became excited and panic-stricken at the smell of smoke, and when one child fell there was a rush for the door in which the others were trampled to death before the flames reached them.

Nevertheless, fire drills should be conducted regularly. It is not important whether the children get out of the building in one minute or in five minutes. The important thing is to get out safely. Generally there is five minutes in which they could get out before the flames could reach them, so that the worst enemy of the children under such circumstances is panic.

The first and most important thing of all in a fire drill is absolute silence. Sometimes a single word of a child has caused many to be hurt. Teachers should see that each child does just exactly as he or she is told, for one wrong move will cause confusion.

In the organization of a fire drill the principal, teachers, janitors and the older children should all be taught to use all fire-extinguishing apparatus in the building.

A leader should be appointed by the principal or the teacher for each class. Each of these leaders should have lieutenants, each to have charge of about 10 pupils, and these lieutenants should be appointed by the teacher. In selecting the boys, of course, care should be taken to pick out those who are calm and not excitable.

The principal should lay down the route from each room to the outside of the building where the children should assemble each in a given spot, although once they get out of the building it is reasonable to presume that in the case of an actual fire they will follow their own way.

The principal should hold meetings in his office at least once a week, at which every teacher should attend. The questions of fire prevention should be discussed and all matters touching on this subject should be brought up, such as cleanliness, heating apparatus, lights, condition of exits, station of fire extinguishers, instruction in their use, talks on fire prevention, improvements in methods of fire escapes, etc.

Frequent Fire Drills Essential

Fire drills should be practiced at least every week, if not oftener, and these drills should be at different times of the day and on different days of the week, so that the children would never know whether it was really a fire or a fire drill that they were responding to.

When the fire bells sound, the teacher shauld call the class to order. Silence is imperative. One of the lieutenants should go to the door and close it. Then he should stand at the extreme end of the room. The teacher should order all pupils to stand in the aisle and then march out double file. There should be no running.

The line should stay in position, each company following its lieutenant until they arrive at their allotted state outside the building. The teacher should remain at the door to see that there is no crowding and that all the children get out safely. After all of the children are out of the building the teachers and leaders of the classes should try to extinguish the fire with fire extinguishers if possible. The children, however, should not be allowed to take their hats, coats or books. That would be valuable time wasted.

Another point is that the children should learn *all* means of exit from the building. It might be that one means would be cut off so that they would have to use another. In view of this, drills should be held in such a way that sometimes one exit would be used and sometimes another.

Schools of more than one story should have lieutenants, whose duty should be to stay at the landing and keep the children in order when they are on their way down stairs.

The janitor should inspect fire bells or gongs at least every week and should see that the fire-extinguishing apparatus is in its place and is in working order. He should also see that all exit doors should open easily, that hinges are greased and that the catches on the doors work easily. It should also be his duty to see that the tables, chairs and other movable objects are not allowed to stand anywhere near the stairways, where they might impede the way of the children.

Desirability of Automatic Sprinklers and Other Extinguishers

As for fire-fighting apparatus, the sprinkler system is a mighty good one to start with. Particularly, as I have said before, these should be installed in the basement and under the stairways, as well as in closets, where rubbish might accumulate.

The soda and acid tank or 2½-gallon extinguisher, as it is called, is entirely too bulky and heavy to use in schools. These weigh 40 pounds each, which is far too heavy for women teachers or children to operate. The only kind of extinguisher that should be installed—and there should be plenty of these on each floor—are the 1-quart pump type fire extinguisher, which is now so well known. These extinguishers are simple to operate and can be used by the children if necessary. A woman would have no trouble in using them.

Inside standpipes with hose attachments are all very well, but they are entirely too big to be used by the women teachers or children in the schools. They should be installed in large buildings, but the hose should be placed high enough so that it will not be tampered with. This can be used by the firemen when they arrive, or by the janitor if necessary.

The use of gasoline, kerosene, benzine, or any other highly inflammable oils, should be forbidden in the building in any way. Where this is impossible, as in the case of manual training schools, the oils should be contained in safety cans.

In short, the question of fire prevention in the public schools is a matter of common sense, so far as fire protective devices are concerned. Nothing should be installed that cannot be used by the teachers. The so-called dry-powder extinguishers, which are sometimes used in putting out a fire, are worse than mucilage. Sand would be better in putting out a fire, as sand is much cheaper than even these tin tubes full of questionable powders.

Avoid Wood Shingle Roofs

The only point that I have not touched on is the construction of the roof. This should, under no circumstances, ever be of wood, and, above all, shingles should be banned. They are one of the greatest means of spreading fire and for school purposes should never be considered for a moment.

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Poor Buildings at Hartford, Conn.

While the conflagration hazard at Hartford, Conn., has been sensibly reduced through the erection of a number of fireproof structures and the installation of automatic sprinkler in these and in additional properties, the large number of old and unprotected buildings in the mercantile district of the city still constitute a hazard that cannot be ignored, say the engineers of the National Board of Fire Underwriters.

Continuing, the engineers state:

"In the congested-value district, structural conditions are largely weak from a fire standpoint, streets are mainly narrow and the inherent potential hazard is high; the sprinkler equipments reduce the probability of fire gaining headway. The increasing proportion of fireproof construction has reduced the hazard slightly and, with the principal street of good width and some open spaces, forms several partial fire stops; these, with the good and fairly reliable fire-fighting facilities, make the probability of a fire involving the entire district only moderate, but in a considerable number of the blocks the probability of serious fires is high, and extensive sections are liable to become involved, depending largely upon wind conditions. In the manufacturing and minor mercantile districts, severe local fires are probable, but should not assume conflagration proportions, except by exposure to other districts adjoining. The large number of frame and brick dwellings with shingle roofs offer the danger of a considerable spread of fire by flying brands."

Lumber Interests Would Repeal Anti-Wood Shingle Ordinance

REPRESENTATIVES of the lumber interests have been aggressively at work for weeks past seeking the repeal of the anti-wood-shingle ordinance at Birmingham, Ala., and while they have not yet succeeded in attaining their purpose, those in touch with the situation concede that progress toward that end is being made, and that the lumbermen will prove victors unless the friends of the safety law bestir themselves far more energetically than they have thus far.

Birmingham's anti-wood-shingle ordinance was adopted in February, 1915, in response to popular demand for such a safety measure and through the insistence of the fire underwriters, who asserted that unless positive efforts were put forth to reduce the fire hazard of the city they would cease doing business there. According to official figures, it was shown that in the five years, 1908 to 1912, inclusive, over 40 per cent of the city's fires resulted from sparks on roofs.

Since the enforcement of the anti-wood-shingle ordinance the loss record of Birmingham has improved to such a degree as to warrant the fire insurance companies in reducing their rates; this action they threaten to rescind if the municipal law in question is revoked.

As against the specious plea of the lumbermen seeking to annul the anti-wood-shingle ordinance is the testimony of Fire Chief Middleton, the best qualified man in the community to speak upon the subject, "that 65 per cent of the fires in Birmingham were caused by sparks on wooden shingle roofs. He said that it was not necessary to place firemen around a building on fire with a composition roof on account of the lack of sparks. Prentiss Reid, of the Southern Adjusters Association, said that there were many elements that made the shingle roof in Birmingham a greater hazard than elsewhere. He spoke of the gases from the furnaces as being of a corrosive nature and aided in making the roofs more hazardous as a fire risk."

To the disinterested onlooker it seems inconceivable that, in view of the experience of their home city, to say nothing of that recently had by Augusta, Nashville and Paris, the use of the dangerous wood roof covering should be seriously considered for a moment.

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$250,000 Fire at Amsterdam, N. Y.

Incendiarism is held responsible for the fire that occurred at Amsterdam, N. Y., on August 18th, destroying several lumber plants and causing property damage estimated at $250,000. In its account of the fire a local daily said in part: "The buildings were of wood and burned rapidly. It looked as if the entire section between the canal and river west of Bridge Street was doomed, but two hours' fighting kept the fire to the section immediately surrounding the lumber yards."

This happening demonstrates anew the menace to communities of lumber properties, especially when they are grouped together and are without special protection.

Code Violation at Augusta, Ga.

Quite a furor was created a short time ago when it became known that a frame building was to be erected within the fire limits of Augusta, Ga., the citizens of the community generally protesting vigorously against such violation of the building code. It developed later that the issuance of the permit had been granted in error by the Board of Examiners, and that no further violations will be permitted. The people of Augusta, having so recently suffered a $5,000,000 fire loss, are in no mood to sanction flame-loving wood construction, and are incensed that even a single structure of this type should have been built within the fire zone.

Jamestown, N. Y.. to Have Building Code

Jamestown, N. Y., a city of considerable prominence, is to have a building code, and the intelligent manner in which the work of its preparation has progressed thus far justifies the conclusion that when the code is completed it will be a credit to its sponsors.

The committee charged with the task is a joint one, made up of ten members from the Board of Commerce; three from the City Council and a like number from the Manufacturers' Association. The Board of Commerce representatives are men familiar with buildings trade conditions and practice, and, in conjunction with their committee associates, are giving close and attentive study to the needs of their home community. The committee is using as a basis for its work the suggested code of the National Board of Fire Underwriters, and has already tentatively approved a considerable part of that work. Correspondence in the matter is being conducted with Prof. Ira H. Woolson, chief engineer of the National Board, and with Virgil G. Marani, civil and consulting engineer of Chicago, and one of the foremost code authorities in this country.

One of the largest real estate transactions recorded in Worcester, Mass., for some time was consummated on the 18th of last month, when Charles F. Stevens purchased a frontage of 177 feet on Main Street. Upon the site Mr. Stevens proposes to erect a mercantile block that will cost not less than $150,000.

Fire Drills From the Employer's Standpoint

By Milton A. Strauss, *of Hart, Schaffner & Marx*

An address delivered at a recent meeting of the Chicago Chapter of the National Fire Protection Association

IT would be superfluous on my part to even comment on the magic results obtained by the National Fire Protection Association, whose kind invitation brings me here to-night. In the first place, you are far more familiar than I with the subject in all its details; furthermore, my commendation of your work would be but a feeble echo of the universal approval and adoption of your creed by both the press and the public of the country. The man who invented the X-Ray, applied so effectually to the practice of surgery and medicine, was one of the great benefactors of the race, and so the unknown prophet who brought into being this great movement for combating the menace of our time, and all time, is likewise a hero of progress and civilization.

Fire is as old as the universe itself—one of its elements—but danger and destruction by fire are comparatively modern human inventions. As man builded, he seemed oblivious of the attending penalty. As he converted to his use the inflammable and combustible products of the air and the sea and the earth, with its forests and vegetation, and invented agencies by which he communicated them to his every home and factory, he disregarded utterly the danger to human life and property accompanying such masterful display of progress. It is wholly unnecessary to tell you all this, but when you men, by your foresight and diligence, bring home these facts to the human race you are subscribing to a noble but belated purpose, and are entitled to much praise for your efforts.

I am not going to consume your time in telling you of the origin of fire or recite any statistics on its destructive record through the ages. So I will immediately proceed to give you briefly—using the fire menace as a text—my humble view as an employer on the subject of preparedness for industrial employees against accident.

Nothing Altruistic in Fire Prevention

The saddest commentary I can make is that there is nothing altruistic in the so-called creed of safety first. It is sadder still to think that we must legislate to compel the employer of labor to safeguard the lives of his people.

With very few exceptions, the measures for safety adopted in this country are coldly commercial, or, in plainer language, they are made to reduce the premiums on fire and liability insurance.

I believe I am right in making the statement that before your movement was launched ninety-nine out of every one hundred employers gave absolutely not a single thought to the safety of the people employed in their establishment. The meager provisions of our building laws are violated time and time again by the greedy owner or occupant of a newly built structure, so that the extent of idle space, as hallways, aisles and stairways are called, is reduced to a minimum. This is called efficiency in utilizing room.

I do not wish to sing the praises of my own company, but for the purpose of illustrating the conversion of some few employers to the new creed of safety, I will say this: that in reconstructing our stairways after the new building code of Chicago was adopted we caused them to be made considerably wider than the drastic law provided. This first new law was enacted, you will remember, during the hysteria following the lamentable Iroquois fire. My company has for years insisted upon the strict observance of all measures intended for the safeguarding of the lives of its employees. I will not enumerate these measures, but I believe you will be interested in knowing that the entire organization has been imbued with the spirit of precaution in this respect, from the heads of the company down to the most subordinate executive, without cessation during many years, so that personally my schooling has been along the lines of higher education in safety regulation.

Fire Drills Necessary

When, several years ago, we instituted the fire drills in our factories, we made a comprehensive study of the entire subject of handling a large number of people during a panic. One of the conclusions reached was that, no matter how adequate the aisles, stairways and exits, the absence of a well-disciplined and favorably officered drill is fatal. I would rather take my chances in a poorly constructed building without liberal avenues of escape, provided a well-organized drill was prepared, than I would in the most perfect edifice ever built, if drill arrangements were absent.

It is incomprehensible to me why the vast majority of people are so ignorant of these few simple features of every-day life, men whose human sympathies are displayed in various other ways, through the channels of philanthropy, etc. The world is overburdened with millions of meetings, clubs and societies for the prevention of cruelties to ants, sisterhoods for correcting the abuse of the old English language, anti-cigarette leagues, temperance societies, anti-graft associations, civic reform, and what-not, but whoever was self-sacrificing enough to speak for public safety until a few profesional insurance men suggested means for reducing the number of fires?

It is too bad that men must band together to fight the iniquity of their brothers, but why ignore the greater enemy in this scramble for self-aggrandizement as speakers and presidents of anti-vice societies?

I suppose the only answer to this is that it lacks the sensational element to attract them. There is nothing sensational in safety first until its absence causes a calamity, and then the unfortunate building inspector, hampered by poor laws and unscrupulous citizens, is placed in the limelight and on trial. I know of a number of large establishments who instituted fire drills for their employees and patrons where the drills were abandoned through sheer neglect and indifference on the part of the officials, and I admit it requires constant vigilance on my part to check up the efficiency of these drills in our factories.

In our factories we are trained, as if almost by instinct, to remove constantly all obstacles placed in aisles, unobstructed passageways being absolutely essential in the success of the drill.

Several years ago I suggested to the Mayor of Chicago that he recommend to the City Council the passage of an ordinance on the subject of public safety. He received my suggestion very cordially and asked me to put in writing the substance of it. I will read it to you.

CHICAGO, July 8, 1911.

Honorable Carter Harrison, Mayor of Chicago,
Chicago, Ill.:

Dear Sir: It is suggested that the City Council of Chicago enact an ordinance providing for the following:

Establishment of the bureau or department of public safety—separate from and independent of any existing department.

This department to be governed by an honorary commission or board similar to the Board of Education; to be appointed by the Mayor and consisting of ——— members.

Provide that all stores, factories, hotels, halls, schools, churches, places of amusement, etc., which employ or admit a number of persons beyond a fixed limit, apportioned to size of building, shall be subject to a *compulsory fire drill* installed and inspected by the bureau of public safety, such fire drill installations and inspections to pay a suitable fee for the maintenance of said bureau or department; the fee to be regulated according to the capacity of building.

The public safety commission shall be empowered to employ expert and competent officers at fixed salaries, such as superintendent of public safety, and as many deputies and assistants as the work of the department may from time to time require.

The ordinance should also include requirements for the necessary equipment of all buildings where the compulsory fire drill is installed—such as fire alarms, bells, signals, etc.

While it is recommended that, for the present, and until such a time that the compulsory fire drill shall be in full operation, the work of this commission be limited to this particular work, it is evident that such a bureau could in time be made a powerful factor for safety in other branches of the city's welfare, such as in the safety of pedestrians at street crossings, patrons of public conveyances, amusement parks, and during street demonstrations, lake, river and air traffic, etc., etc."

Mr. Harrison, as the records show, submitted my letter to the Council at a meeting in 1911, and a law was enacted shortly thereafter which provided very sparingly for the matters embodied in my communication. The new law contained one provision, however, which made fire drills compulsory and, as you well know, was declared unconstitutional by the courts.

I wish to say this: that during the brief enforcement of that law the personal responsibility for checking up on the drills was taken out of our hands, and, personally, I was relieved of much worry by the influence of authority exercised by the Fire Prevention Bureau on all the people in charge of the drills. If our drills were efficient before, they were perfect during the period of city inspection, and I regretted most sincerely, and do now, the taking away of that law.

I do not know the scope of your association's work, but if, through your influence and the right kind of propaganda, you can assist in enacting legislation to compel fire drills in all public and quasi-public institutions, you will be doing an act for the community equal to any preparedness now being agitated the country over.

When I suggested to the Mayor that the administration of public safety be taken out of the hands of the building and fire department I had the same erroneous notion that so many of we citizens have—that there are no efficient men in the city employ. At that time I was not acquainted with Mr. McDonnel. Now I know the work of this department; I am acquainted with the handicaps he has worked under, and I wish to say I have never met an executive, even in private bupsiness, more skilled, untiring and conscientious in his work than this man, and when a public official deserves praise he should get it abundantly. There are such men in the public service, and they should be commended.

Public safety, then, is a matter of education. The gospel must be spread and laws made to compel the negligent official to do his duty, whether he control a factory, department store, school, church, theater, or any institution where large numbers of people gather.

From what I have said it might appear that I am unmindful of the splendid work accomplished throughout the country in matters of public safety. My statements of the existing delinquency apply particularly to our own city, where very little progress has been shown and a very feeble attempt made in this new movement. I am not a Chicago knocker, and in calling attention to our negligence in this regard I am rather in the role of a booster.

It is high time that some constructive action be taken. The subject is fully as worthy of the attention of ministers, societies and women's clubs as the poor, down-trodden cabaret and Sunday bar.

There is now being enforced a state law on the subject of ventilation in factories—a very laudable reform—but perfect ventilation will not assist persons to safety during a panic.

My recommendation to you and all public-spirited bodies is to agitate, and strongly, the enactment of legislation that will provide the much-needed remedies for all occasions when groups of people congregate for any purpose whatsoever.

Building Loan Assets Jump

10 Per Cent Increase Reported at Opening of Convention at St. Louis

AN increase of nearly 10 per cent in building and loan associations' assets in the past year was reported to the opening session here to-day of the United States League of Local Building and Loan Associations by H. F. Cellarius, Cincinnati, secretary of the organization. The convention will last two days.

Secretary Cellarius also showed decided increases in memberships in the various locals, his report, in part, being as follows:

"The popularity and growth of the local building and loan associations of the United States continues on the increase, as is indicated by the statistics for the last year. There are now in the United States 6,806 associations, with a total membership of 3,334,899, and assets amounting to $1,484,205,875. This is an increase in assets for the year of $126,497,975, or 9.3 per cent. The membership increase for the same period was 230,964, or a little more than 7 per cent.

"The onward movement has been most marked in the last decade, during which period these associations have more than doubled their assets and nearly doubled their membership. In 1906 the total assets of the local associations were $673,129,198, and the total membership was 1,699,714, an increase in assets in ten years of $811,076,677, and in membership 1,635,185.

"No class of financial institutions anywhere is contributing so largely to the material welfare of the wage-earners of this country as are the building and loan associations in the work which they are now carrying on so quietly and unostentatiously, that the general public has but a slight conception of the magnitude of their operations. They are meeting an actual want in a spirit of cooperative helpfulness by providing a safe means of investment for small savings and employing these sums for home building and home owning purposes.

"Ohio shows the largest increase in assets for the year, gaining $22,175,828, followed by Pennsylvania, whose increase is $21,893,720. Other increases for the year are: New Jersey, $11,298,097; Massachusetts, $10,761,848; Illinois, $7,818,325; Indiana, $7,251,531; Iowa, $5,150,507; Nebraska, $4,522,457, and New York, $3,943,159.

"The average amount due each member is $445.05, as against $437.41, the amount shown last year."

Fire Causes Classified

IN the month of June last 177 fires occurred in Kansas, according to the report of the State Fire Marshal. Classified as to causes, the record shows the following:

Flues, 12; electricity, 3; explosions, 1; friction, 14; gas, 2; exposure, 14; hot grease, 1; incendiarism, 7; lightning, 41; matches, 12; miscellaneous, 3; gasoline, 7; kerosene, 9; open fire, 1; rubbish and litter, 3; smoking, 4; sparks, 10; spontaneous combustion, 6; stoves and furnaces, 3; unknown, 37.

Face Brick for New Post Office

Under the direction of F. A. Hills, of the Government construction service, the new Post Office building at Greenfield, Mass., is rapidly nearing completion. The structure will have cost about $60,000 when finished, with an additional $10,000 for equipment. The building is of face brick with limestone trimmings. It is fireproof. It is of the usual Government architecture and is called a two-story building, with a one-story workroom. It is 90 feet long and 60 feet wide. The bronze work cost $9,000.

Better Fire Protection for New York City

FIRE Commissioner Robert Adamson, of New York City, in his latest annual report, made a number of recommendations looking to increasing the fire protection of the municipality. Among other suggestions of Mr. Adamson were the following:

"That the purchase and operation of private fire alarm companies as a part of our system be authorized.

"That steps be taken by the Water Department by which sprinklers, to be connected with the city's water system and operated by pressure from the mains, may be installed in cellars of tenement houses. I am advised if this is done sprinklers can be installed at a cost of $75.00 per building, which sum could easily be saved by the reduction in insurance. Such installations would greatly reduce the loss of life from fire in tenement houses.

"That the Water Department be requested to make further investigation of the feasibility of increasing pressure in the Croton mains for the operation of sprinklers in factories and other buildings. This would eliminate the cost to the owner of roof tanks and pumps where sprinklers are installed and greatly accelerate sprinkler installations."

Excessive Figure for Alarm Service

Speaking to a representative of CONSTRVCTION regarding the attitude of the governing authorities concerning the above, Deputy Fire Commissioner Clarence H. Fay said:

"The purchase by the city of private alarm companies has been recommended to the Board of Estimate and Apportionment by the Fire Commissioner, but no action has been taken. I am informed that these private companies have asked a price which is highly excessive, and that is probably the reason the city has not gone ahead with negotiations.

"The direct connection of sprinkler systems with street water mains, thus eliminating the necessity of roof tanks, is largely a question of pressure. It is understood that the present pressure is not sufficient for this purpose, but it is hoped that when the city is actually using the new Catskill water supply this plan can be carried out. I believe it is Commissioner Adamson's intention to again take up the matter at that time."

Protecting a Convention Hall Against Fire

TO J. C. McDonnell, chief of the Bureau of Fire Prevention and Public Safety of Chicago, was entrusted the safeguarding of the Coliseum at the Garden City during its occupancy by the Republican National Convention in June last.

In describing to CONSTRVCTION the measures adopted, Chief McDonnell said:

"At the outset it is well to understand that, while the Coliseum building is of semi-fireproof construction, there were 167,000 feet of lumber used in the erection of a grandstand, sub-balconies and speakers' platform for the accommodation of the convention, and in addition a vast number of partitions formed of both lumber and canvas on the three floors of the annex. The latter building was occupied for office purposes, committee rooms and by telegraph and newspaper representatives. The dome of the Convention Hall was covered with cloth decorations, all of which, together with the canvas enclosures, were treated with a fireproof solution.

"About a week before the opening of the convention, and at a time when scores of carpenters, electricians and other mechanics were at the very height of their activity in the structure, I had a conference with Col. W. F. Stone, sergeant-at-arms of the convention, and Assistant Sergeant-at-Arms Thayer, at which details of the general fire protection scheme were agreed upon. From that date until the opening of the convention I had six city firemen in the hall every day and evening so long as a single person was at work in the building. When the convention met, and continuously throughout its sessions, fifty firemen, divided into details of ten each, were on guard, each company being under the direction of a lieutenant from the city fire department. Men were stationed at every exit from both the main floor and from the balconies, this precaution being observed in the annex as well as in the main structure. Special attention was devoted to the great spaces underneath the vast lumber-built grand-stand and sub-balconies.

"Additional fire appliances in the way of chemical extinguishers and fire axes, together with six large wheel chemical carts with a hundred feet of one-inch hose on each cart, were advantageously placed throughout the structure, all ready for instant and effective service.

Fortunately, there was no occasion to put the precautionary measures created by Chief McDonnell to a practical test; had the demand arisen, however, there is no doubt but what they would have proven ample. Their adoption gave to the convention delegates and others in attendance at the gathering a sense of security from fire which more than compensated for the expense entailed.

SAFE HOMES—*Editorial*

By Ralph P. Stoddard

Why Do They "Knock"?

WHEREVER safety legislation is under consideration, with a view to making our cities safer to live in, and aiming eventually to reduce the enormous fire waste from which the country suffers every day in the year, there will be found the lumber interests lined up solidly to oppose it. They consistently fight every safety measure having to do with the elimination of fire, regardless of its merit. Their zeal in this direction leads them to oppose such reforms even in communities which have suffered conflagrations.

The chief plaint of the lumbermen is that every piece of fire-safety legislation, such as the abolition of wooden shingles in certain areas or restriction in the use of inflammable materials, is a direct blow at their business. In many instances they have been able by this cry of confiscation to defeat worthy measures. Only in cities which have suffered conflagrations do their contentions go entirely unheeded.

There appears to be on their part a decided lack of accurate information as to just what constitutes a fire-safe house. The day of the fireproof house; that is, in which wood is entirely eliminated, is on its way; yet somewhere in the future. For the present walls and roofs of fire-resistive materials are considered a notable improvement over frame and a protection against the exterior fire hazard.

Entirely aside from the fact of the greater safety and the virtual elimination of the conflagration hazard resulting from the use of safe building materials, the lumber interests appear very much out of order in their fight against the materials which they call "wood substitutes."

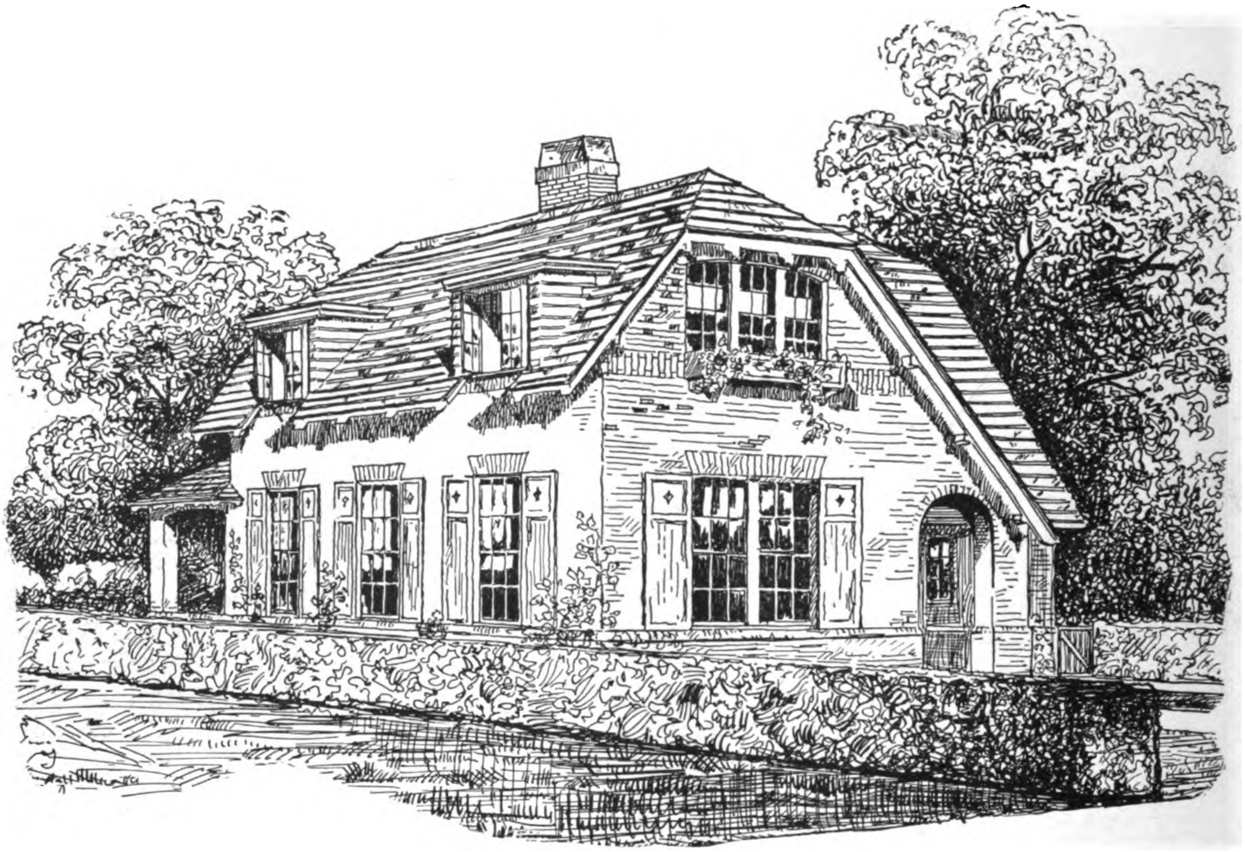
A study of the facts shows that even in the erection of the "safe" house lumber takes a lion's share of the cost, as compared with the non-burnable materials. And this does not take into account the trades which are in a way contingent upon the use of lumber for interior and exterior trim, such as painting, that come in for large blocks of the building cost.

A case in point is taken from a builder's estimate made during the past month in Cleveland. The bid was upon a house 25 feet square, containing six rooms, and with an exceptionally plain exterior. The specifications called for an exterior finish of face brick over hollow building tile, and with porches, both front and rear, of brick with brick steps.

The masonry bill for this house was $1,320, to include all necessary materials and labor. In striking comparison is the bill for carpenter work of $1,750. The plainness of the exterior of this house meant that this item was limited almost entirely to floors, partitions, roof and interior trim. The carpentry cost, even in a fire-safe house, will be seen to constitute almost 45 per cent of the entire cost of the building, while the amount of money obtained by the same material dealers and workmen is about 30 per cent. The item for painting the small amount of exposed woodwork, such as door and window frames, cornice and window-boxes and for painting and varnishing the interior trim amounted to $140.

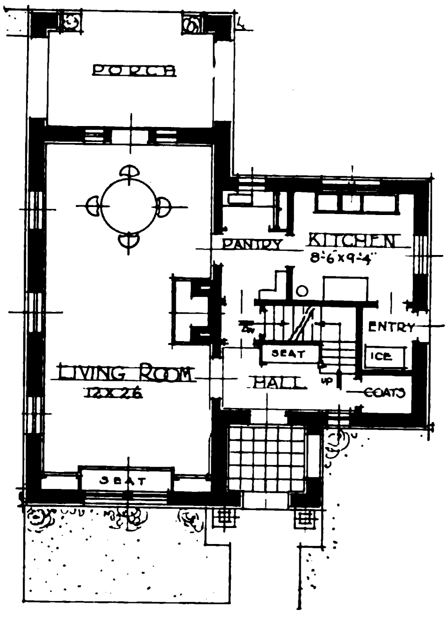
From these figures it would seem to be rather difficult for the lumbermen consistently to charge the makers of safe materials with seeking to ruin their business. It is apparent that they "want the whole hog" and are not content to let the safe-material interests have even a modest 30 per cent of the money spent.

However, the sentiment for safe materials, which result in a permanent investment for the owner, is growing, and even the watch-cry of the lumbermen that tinder-box construction "costs less" is failing of effect, when considered in the light of such examples as that just given.



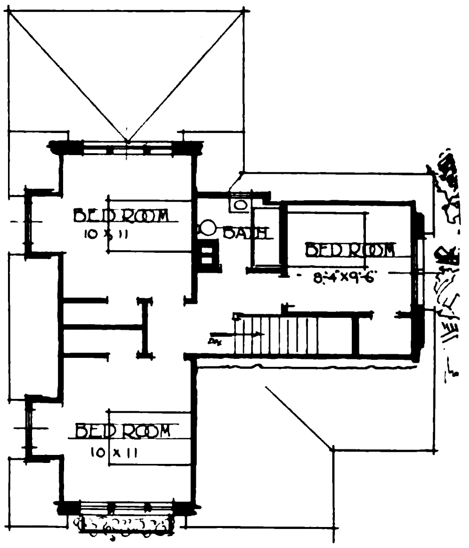
An English Design

ONE who has traveled in England will at once recognize this little cottage as very closely resembling those of that country. In its planning, also, the architect, Albert M. Kreider, of Boston, has incorporated many of the good features of the English small home.



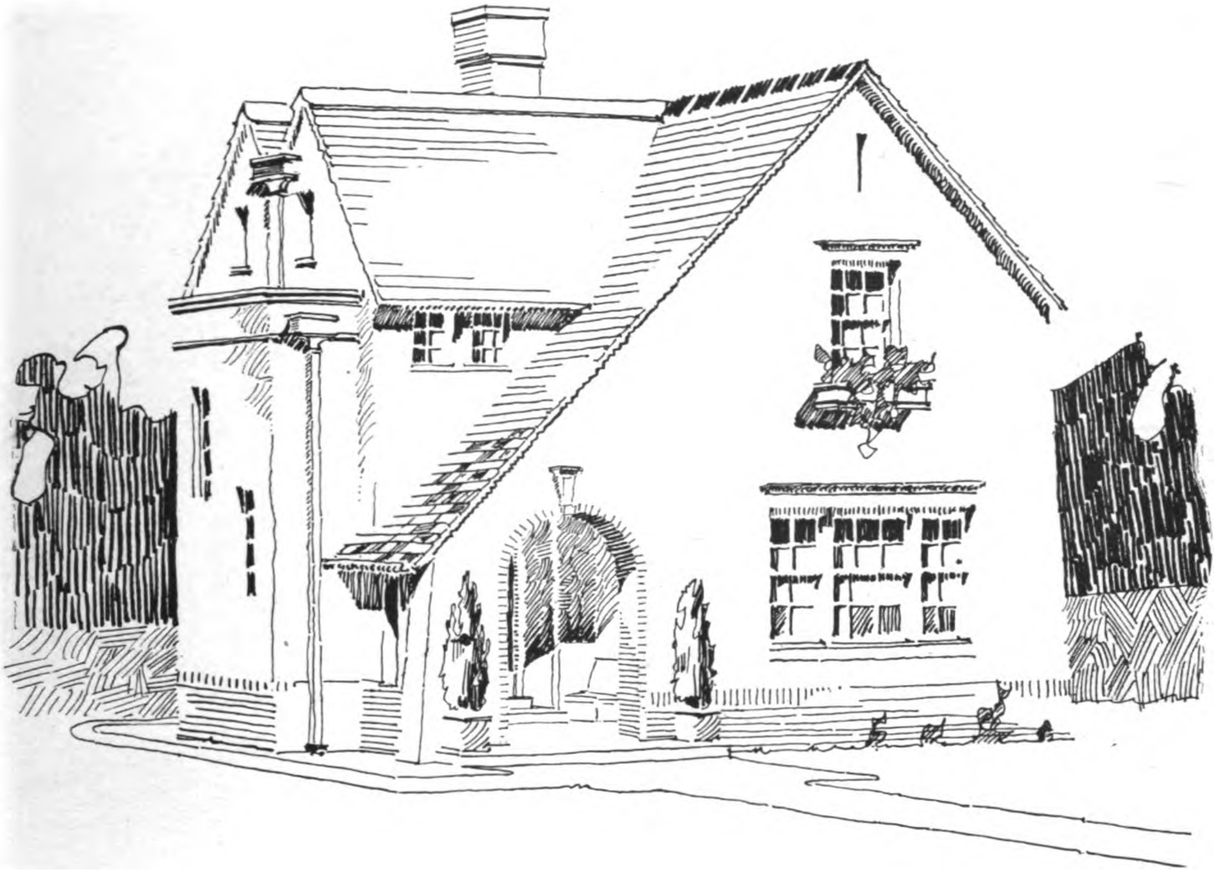
Among these is the combined living and dining room—a feature which American homes might well copy, as it gives the maximum of space available for each in case of need—and the porch on the rear facing the garden for privacy.

The other features of the down-stairs arrangement are the little entrance hall, opening into the service part of the house, as well as giving access to the stairway, and the kitchen entry with place for the ice-box.



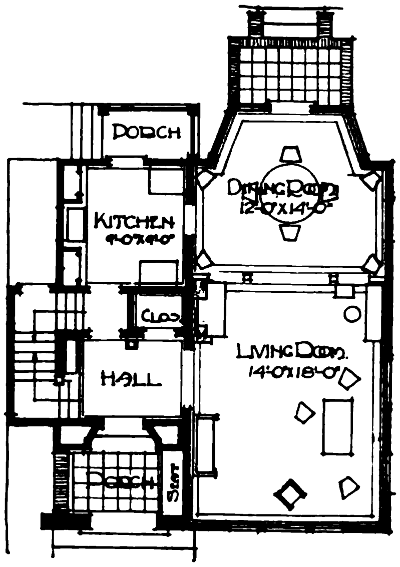
Three good-sized bed-rooms are provided up-stairs, two of which are ventilated from two sides.

It is estimated that $4,000 will build this little house of brick in most any city of the Central West, with a tile roof, which will make a consistently fire-safe home.



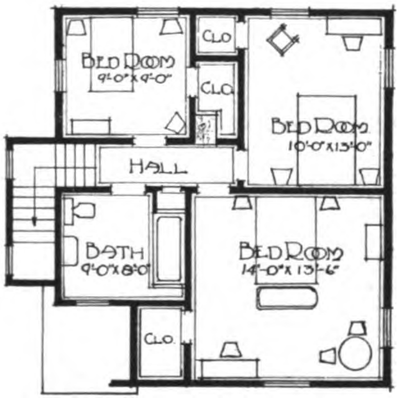
A Stucco Cottage

DOUBT seems to exist in the minds of many prospective home builders as to the permanence of stucco finish for houses. As proof of the fallacy of this belief it may be stated that in a recent architectural competition more than three-quarters of the total number of designs called for the use of this material. With architects from all parts of the country favoring stucco, the arguments against it do not carry much weight.



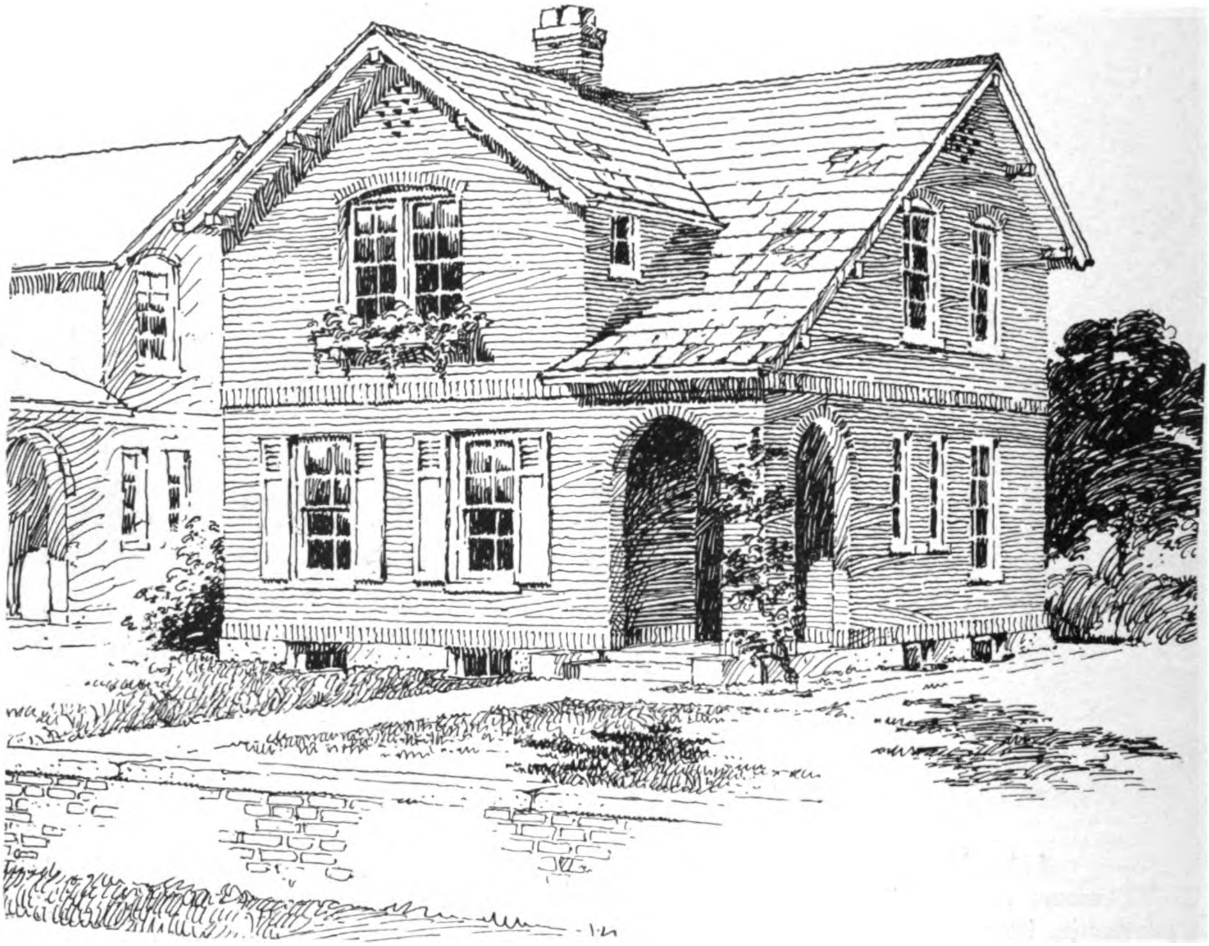
It is, of course, possible to "cheat" this material, just as any other may be cheated. But when made of the right combination of materials and properly applied it will outlive the owner and many of the other materials entering the construction of his house.

The home shown is an excellent example of the artistic possibilities of stucco. The architect, William H. Hogue, of Cleveland, has produced a cottage of exceptional beauty and exceptionally good living qualities. A glance at the plans will show an excellent arrangement of rooms on both first and second floors. All are of good size and are liberally supplied with windows.



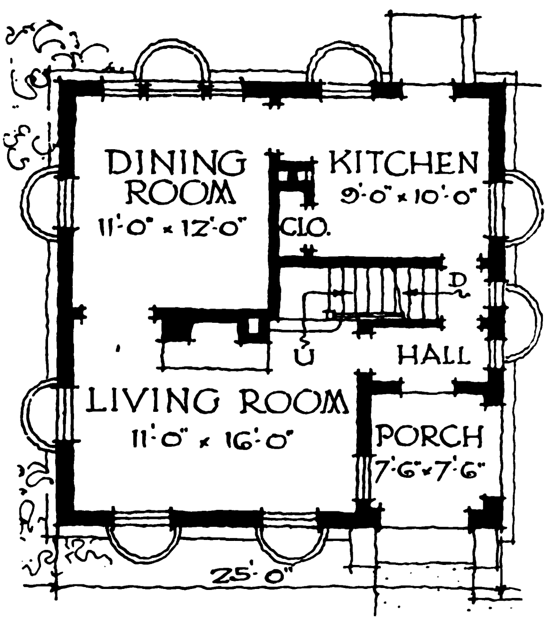
With the house placed to face the south, the big dining room bay makes a delightful place to breakfast during the Winter months, when sunlight is at a premium.

The entrance hall and the convenient planning of the stairways add to the desirability of this stucco cottage.



A Simple Home

THAT a great measure of the beauty of the brick home lies in its simplicity is well shown in the accompanying picture of a little cottage, by George W. French, of Cincinnati. In its design he has carried the process of elimination almost to the limit. The shutters on the front windows and the flower-box are the only decorations shown. Yet the result is a house which for beauty it is difficult to equal.

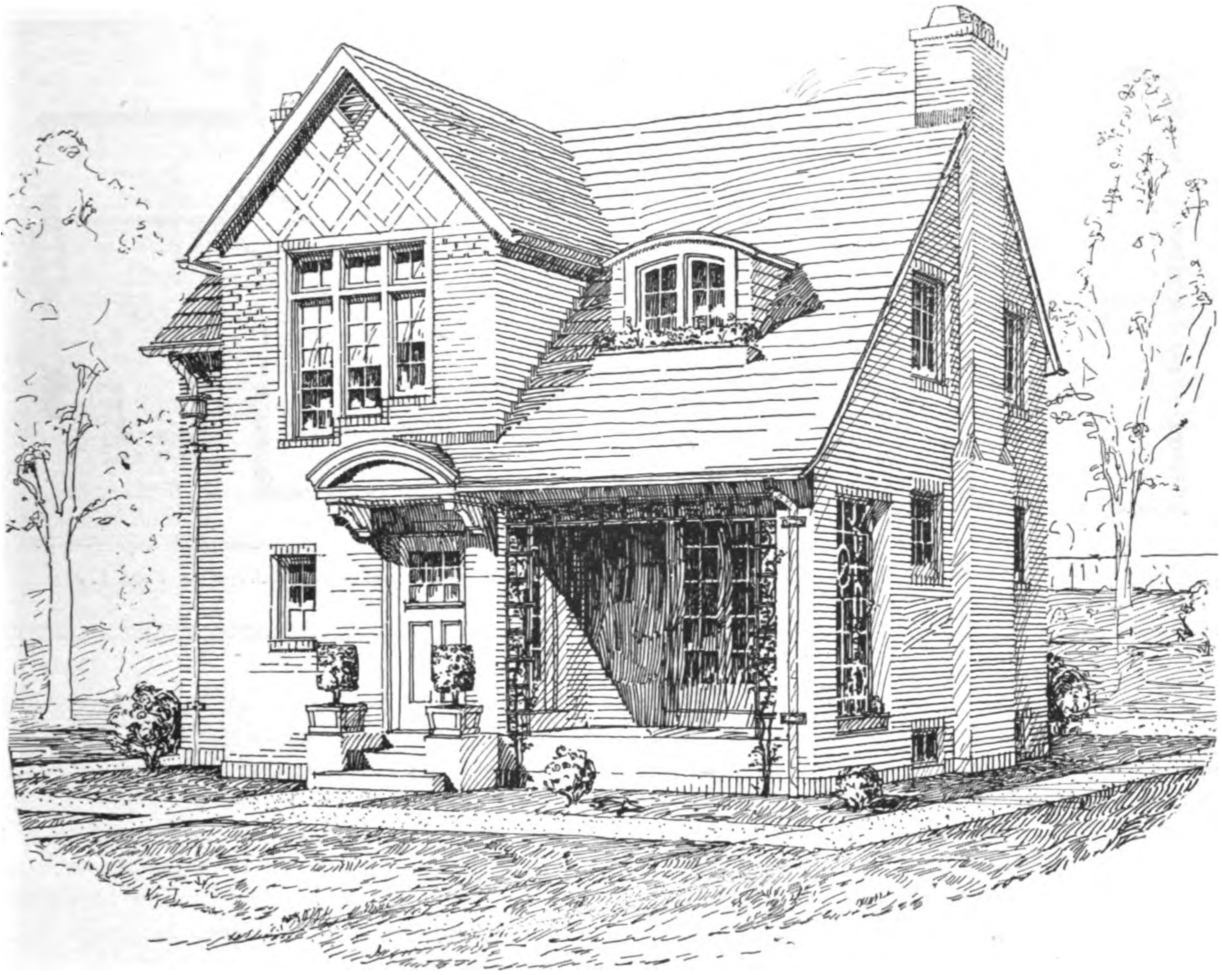


The planning and arrangement of rooms for utility and convenience is on a par with the exterior design. The little entrance hall with the passage through to the kitchen is an exceptionally desirable feature. The living room is large and the fireplace well located. The dining room has an abundance of windows and plenty of wall space for the placing of furniture. The kitchen provides ample space for the necessities of the culinary department.

The second-floor rooms are large and practically square, made possible by the minimum of space being devoted to hall. For a small family, the front room, with its fireplace, offers an excellent lounge.

It is estimated that $4,000 will build this little home in cities where prices of materials and labor are about on a par with those in Cincinnati.

The second floor plans of this house and that on the opposite page will be found on page 180 of this issue



A Novel Home of Brick

FOR the man seeking a home having individuality enough to distinguish it from its neighbors, the little house shown above will offer an interesting suggestion.

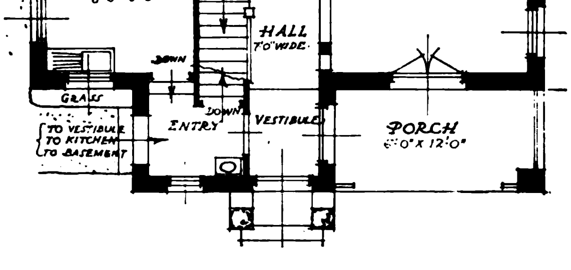
Designed for the use of brick, it avoids bays and irregular angles, which complicate brick-laying and increase cost. All walls are straight and the windows are so grouped that a simple bond can be used without the house having the look of severe plainness, from which some brick houses suffer.

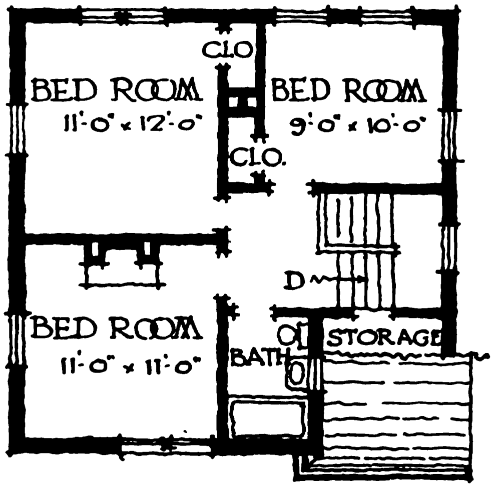
The recessed porch, opening off the vestibule and living room is, of course, the feature of this little home. This enables it to be screened or glassed to make it livable the year round. The placing of the living room in a wing provides light and ventilation from three sides.

In general planning, the architect, Harvey James Pearce, of St. Louis, Mo., has followed the English custom of giving living room and dining room a view to the rear, overlooking a garden—a feature few American homes have, but which would greatly improve them. The placing of the service in the other wing allows for a kitchen yard at the side, leaving the garden side unobstructed.

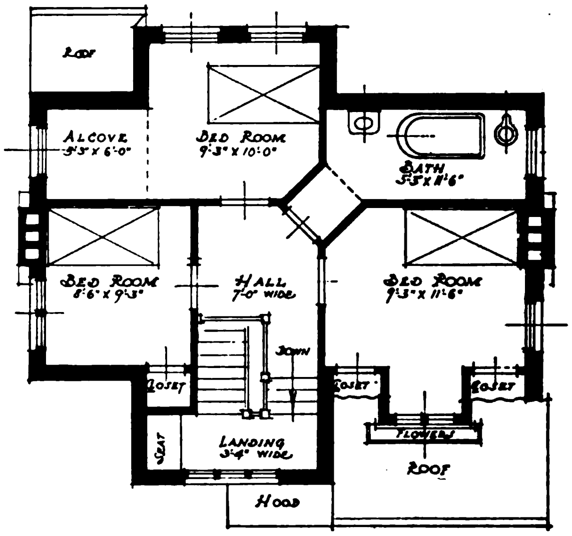
The bed-rooms are of good size and are well supplied with windows for light and air.

The estimated cost of this house is about $4,500 in cities of the size of St. Louis.





Second floor plan of house shown on Page 178



Second floor plan of house shown on Page 179

A "Safe" Convert

In no city in the country, so far as can be learned, is the movement for safe building gaining greater headway than in Cincinnati, Ohio.

There the competition between frame and safe materials, in point of ease of obtaining materials and labor, has offered a fair field and no favorites. In face of this condition the demand for safe residence buildings—both apartments and houses—is increasing daily.

In some of the newer real estate developments the preponderance is largely in favor of safe buildings of all kinds. The demand for one type, the "double-decker" or two-family flat, has shifted, according to a prominent builder of that city, almost entirely to safe construction. This type of building, he says, is bought in most cases as an investment, rather than for speculation, and buyers favor the safer and permanent type of construction.

It must not be considered, however, that the safe building is entirely on the part of the prospective owners themselves. The largest real estate operator in Cincinnati—J. G. Schmidlapp—has shifted completely from wood construction to the safe type. He is constructing about five hundred houses, all of which will be of safe materials.

His operations are almost entirely the results of the efforts of The Safe. About a year ago a meeting of the builders' supply dealers of Cincinnati and vicinity was held to hear addresses by various representatives of The S-A-F-E, of which there were several from their city, on the Safe movement and the activities of the society.

At that time Schmidlapp's project was still in process. The benefits of safe construction were brought to his attention by members of the S-A-F-E and others, with the result he decided to use safe types of construction in all his operations.

His operations are exceptionally complete and include all types of buildings from tenements to single homes. From all parts of the country he gathered a fund of information on residence buildings, with the result that his buildings are models of their kind.

He is employing many combinations of materials in his construction, including monolithic concrete, tile and brick and tile and stucco.

And the benefits of this gigantic home-building project may be traced directly to the S-A-F-E meeting held in that city.

Tile Makers Reorganize

During the past month a reorganization has been effected of the Hollow Building Tile Manufacturers' Association of America, which entails the removal of the association's headquarters from Cleveland, where it was organized, to Chicago.

H. H. Titsworth, of Indianapolis, heads the new association. The secretary and active manager is R. F. Hall. He will have charge of publicity and promotion work in the interest of hollow tile for building. The tile makers plan an extensive campaign in the interest of their product.

Chas. T. Harris, secretary of the association since its formation, resigned to enter business for himself in Cleveland. He has organized a business service company in association with the Cleveland representatives of the well-known Sheldon School, of Chicago.

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

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New York City, N. Y., September, 1916 Priceless

THE KNOCKERS

I know he must be doing well,
I know he's getting on,
His work has now began to tell,
His struggle time has gone;
He now has passed the dreary days,
The lonesome ones and grim,
And now is treading better ways,
Her folks are knocking him.

His skill has caught the eye of men,
His worth is seen at last,
He's left the throng that knew him when
His skies were overcast.
He's won the laurel for his brow
by toil and pluck and vim,
And he is doing real work now,
For folks are knocking him.

The Knocker is a curious cuss;
He never starts to whine,
Or fling his envious shafts at us,
Until our work is fine.
It's only men with skill to do
Real work he tries to block,
And so congratulations to
The man the knockers knock.

—Detroit Free Press.

◆

NEW "THRU-AND-THRU" TERRA COTTA

The new product being made by the Steiger Terra Cotta & Pottery Company, San Francisco, called "Thru-and-Thru," is shown in several new styles in their window display in the Mills Building on Bush street. This high-class colored product, mentioned in last month's Constrvction, has brought forth many inquiries from architects and builders and there remains little doubt that its special merits will result in its application in the near future to many important structures. At this time the company is giving special attention to a thorough demonstration of the material and its properties.

ASPHALT INDUSTRY PROSPEROUS

The asphalt industry as a whole was prosperous in the year 1915, according to a statement just issued by the United States Geological Survey. The natural asphalt, including grahamite, gilsonite, elaterite and bituminous rock, produced and sold at mines and quarries in the United States in 1915, amounted to 75,751 short tons, valued at $526,490. Though this quantity was 5 per cent less than the output in 1914, the reports of the sales of manufactured asphalt derived from petroleum of domestic origin disclose a gain of 84 per cent over the quantity sold in 1914. The total sales of manufactured asphalt amounted to 664,503 short tons, valued at $4,715,583. In addition to this output, refiners in the United States made and sold 388,318 short tons of asphalt, valued at $3,730,436, that was derived from petroleum imported from Mexico.

The decrease in the output of natural asphalt is confined to bituminous rock and is due largely to the keen competition that this type of asphalt is forced to meet in its chief market—the paving industry—with manufacturerd substitutes.

◆

A NOVEL FIRE ALARM SYSTEM

Some years ago, when the writer was traveling through a frontier town, in response to his query as to what measures the citizens took when a fire was discovered, the sturdy native son replied, "Oh! We just shoot our guns and yell like hell!" That the information was evidently not untrue is proven by the following press report from the Southern border:

"Mercedes, Tex.—Twenty shots fired early to-day gave an alarm of fire, which caused residents to believe another bandit raid was in progress, and they, with the fire department, remained in their homes. As a result, a dance hall and several houses in the Mexican district were burned. Officers say the fire was incendiary."

◆

ALFRED HAS NEW CERAMIC INSTRUCTOR

Joseph P. Shaw, ceramic engineer, of Pittsburgh, Pa., has been appointed professor of ceramic engineering in the New York State School of Clayworking and Ceramics, at Alfred University. The new professor will take up his residence at Alfred in September.

The Pratt Building Material Company is supplying their new Hercules Interlocking Tile for a number of jobs, some of which are a business block at Eighth and Mission streets, a large apartment house at Jones and Hyde streets, and the John Bollman Building at Fourth and Bluxton streets, San Francisco.

◆

At the end of six weeks of married life a Southern darkey returned to the minister who had performed the ceremony and asked for a divorce. After explaining that he could not give divorces, the minister tried to dissuade his visitor from carrying out his intention.

"You must remember, Sam, that you took Liza for better or for worse."

"I knows dat, boss," rejoined the darkey; "but she's wuss dan I took her fer."

"There is no influence in any community more potent and powerful for the accomplishment of good than that of the business and professional men unselfishly banded together for the purpose of promoting the general welfare of the entire citizenship."

The Fireproofing News

STEEL STANDS SEVERE SCORCHING

Marshall Jackson Company, 24-26 Clark street, Chicago, Ill., selling agents for Art Metal Construction Company products, were victims of a heavy fire loss during July, concerning which O. R. Guether, manager of the office furniture department, says:

"Our third and fourth floors were destroyed. There were a good many Art Metal cases on the fourth floor, but none of them had papers in them. The finish, of course, was burned away, but the drawers work as well as they ever did. We will try to retain several of these cases, also a steel desk, so as to show the contrast between the wood and steel after the fire. After the floors have been cleaned out and we get to the bottom of the rubbish heaps we probably will find other interesting things."

Naturally, their stock of wood files was practically a complete loss, but their steel files can be refinished and will be as good as new. The fire hazard is another good reason for selling steel instead of wood.

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NEW RANDALL'S ISLAND BUILDINGS

Plans have been filed for the construction of four new buildings on Randall's Island, New York City, for the Charities Department, to cost a total of $308,000.

One building will be two stories high with a frontage of 42 feet and a depth of 62 feet, and is to be occupied by two married physicians and families and eight bachelor physicians and will cost $42,000. Another is of two stories and basement with a frontage of 98 feet and a depth of 40 feet and is to be used as a dormitory for female help and the cost has been estimated at $49,000. The third, 126 feet by 105 feet, two stories and basement, is to be used as an infirmary for idiots, to cost $127,000, and the fourth, two stories and basement and having a frontage of 134 feet and a depth of 56 feet, will be occupied as a cottage dormitory for imbeciles, to cost $90,000.

All of these buildings will be fireproof. Donn Barber is the architect.

The reason a new born babe cries is because it is born—what else has it to cry about?

◆

The costumes at the opera never proved that women were fond of dress.

◆

NEW ASPHALT SHINGLE

The Heppes Company, of Chicago, Ill., has brought out a new line of asphalt shingles, known as Style 4 Square Butt Slab, in order to meet the demand for an asphalt shingle of the same quality as their diamond point slab, but different in shape and appearance.

Like the diamond slab, this new shingle is really four shingles in one, and a considerable saving of time over the old way of laying shingles is said to be effected. No time is wasted in chalk-lining because the slabs automatically space and gauge themselves. They give the appearance of single rectangular asphalt shingles with the economy of the slab.

◆

The annual statement of the Geological survey on slate in 1915 is available for distribution. According to this report, the total value of the slate sold in the United States during the year was $4,958,915.

MEDUSA WHITE CEMENT IN MANY PLACES

Medusa White Cement, produced by the Sandusky Cement Company, was selected by Hoggson Brothers, of New York, to set the face brick and terra cotta in the First-Bridgeport National Bank Building, Bridgeport, Conn. Hoggson Brothers' organization has probably built more banks under its single contract method, guaranteeing the cost to the owner in advance, than any firm in America. Their business is widely known and they are acknowledged experts in the planning and arrangement of bank structures and equipment.

Medusa White Cement was also used by Hoggson Brothers on the Farmers and Mechanics Bank, Middletown, Conn., in setting terra cotta and brick work, also for interior and exterior work on various libraries and other buildings.

The new Y. M. C. A. at Elyria, Ohio, planned by Paul A. Rissmann of that city; the great Traymore Hotel at Atlantic City (Price & McLanihan, architects, Philadelphia); the splendid Chicago Boys' Home, the creation of Mundie & Jensen, Chicago, and St. Agnes Convent, Calcutta, India, are notable instances where Medusa White is giving excellent service. As a medium for orna-

Medallion of Medusa White Cement

mental work, its merits are proven by such examples as the Plaza Hotel fountain, St. Louis, made of and waterproofed by Medusa Waterproofing White; "Stonecrete," located in Woodlawn Cemetery, Albany, N. Y., designed and built by Adolph Schilling, of Haddon Heights, N. J. The base of this monument is 14 feet long by 7 feet wide, the shaft being 4 feet wide and 9 feet high, in one piece, with the "Angel of the Resurrecton" in bold relief. The total height is nearly 14 feet. The perfect and elaborate medallion shown here compares favorably with costly carved stone, revealing the possibilities of cement for effective and durable ornamentation, figures, medallions, cartouches, frieze courses and work in bas-relief. It exemplifies the adaptability of concrete for architectural purposes, permitting beautiful and dignified decorations, especially where a minimum cost is essential.

Fountain of Plaza Hotel, St. Louis, of Medusa Waterproofed White Cement

LUMBER PROGRESSIVENESS

That French architects, engineers, builders and others are looking ahead and preparing for other activities aside from those of war is attested in the fact that an exposition is now being held in Paris for the purpose of teaching, even at this very early date, how to rebuild war-wrecked cities and towns of northern France after the present appalling conflict is ended.

"The Reconstructed City" is the name of the exposition. It is entirely a French venture, *and the only part that American manufacturers have taken in this unique affair has been displayed by the lumbermen who have arranged an exhibit showing the possibilities of American lumber in this work of reconstruction.*

"The Reconstructed City" is in several sections, some of which are devoted to city residence construction, city industrial buildings, city planning, rural work, etc. In some cases the city planning department will work for an entire reconstruction on altogether new lines of the cities which have been wrecked by bombardment. In other cases only building construction along the old streets will be required.

Southern Pine Association Active

The *Southern Pine Association,* through its European agent, has an exhibit not only of Southern building types but of typically American structural work. The American lumber men have a series of models for buildings for city and farm, including a small "mill-construction" building for industrial purposes, and models of farm building, such as an ideal barn, poultry house, granary and piggery. Photographs of groups of these buildings are included, and the balance of the exhibit is made up of samples of Southern pine in various stages from the original timber to the finished lumber. One of the unique features of the exhibit is a relief plan of an ideal farm with model buildings properly placed and landscape effect with hills in relief, streams, roads, etc.

Where are Firesafe Material Men?

Where are the manuafcturers of firesafe building materials in this exhibition? Who is telling and proving the unexcelled excellences of those materials which really represent modern American building methods and practice? If the lumbermen can go over to France and display timber products, will any man be bold enough to say why firesafe material makers should not do likewise? The reason, in a word, is because the manufacturers of firesafe products lack the splendid organization which is behind lumber. "The Reconstructed City" is but one of a score of examples which could be cited showing the great need of further organization and associated effort on the part of various trade associations representing fireproofing interests.

NEW DRY PIPE VALVE

TO REPLACE OLD MODEL IN GENERAL FIRE EXTINGUISHER COMPANY'S INSTALLATIONS

The purpose of this article is to bring to the attention of our readers the construction and method of operation of the new Model "C" Grinnell dry pipe valve, which will son replace the Model "B" as regular equipment in the sprinkler installations of the General Fire Extinguisher Company, of Providence, R. I.

When there is likelihood of the sprinkler pipes being subjected to temperatures below that of the freezing point of water the dry pipe system is used. This differs from the ordinary or wet pipe system in that compressed air instead of water fills the pipes until a sprinkler operates, when the air quickly escapes and water is admitted. In order to thus control the flow of water dry pipe valves are used. Their function is to exclude water from the sprinkler system until a sprinkler opens.

This seems a very simple thing to do, requiring nothing more than an ordinary check valve. There are, however, practical difficulties, because with such a valve the air pressure must be maintained in excess of water pressure in order to keep the valve closed and the water out.

The late Frederick Grinnell was the first to appreciate this difficulty, and in order to overcome it he designed a valve having a small area exposed to the water and a large area exposed to the air, thus making it possible for air at a moderate and convenient pressure to hold in check water at a much greater pressure. Valves of this type are known as differential valves, and because of their simplicity, reliability and ease in handling have been the only kind manufactured by the General Fire Extinguisher Company. The first differential valve was introduced in 1885 and used until 1890. Its successor was the well-known No. 12, which was the standard of the industry from 1890 to 1907. Although in its later days the No. 12 was criticised because of its obstructed waterway when open, the difficulty of renewing the rubber air valve, the presence of fine threaded openings into the intermediate chamber and its dependence on a latch, it has, nevertheless, participated in the extinguishment of more fires than any other dry pipe valve, and it has as good a record of consistently successful performance as any. This valve was followed by the Model "A" Straight-way Dry Pipe Valve, which had for its leading feature, as its name indicates, a straight and unobstructed water-way when open. Model "A" was soon succeeded by Model "B," similar in all but minor details. The service records of both types of straight-way valves have been most satisfactory.

The new Model 'C" valve is shown in cross-elevation in Figure 1 and as it would appear in a sprinkler system in Figure 2. In this valve the desirable simplicity of the No. 12 has been retained, although none of the objections are present. The water-way is entirely unobstructed when the valve is open and the entire clapper can easily be removed through the hand-hole, should this be necessary. There are no openings into the immediate chamber that could cause the loss of any considerable amount of water, and under service conditions the opera-

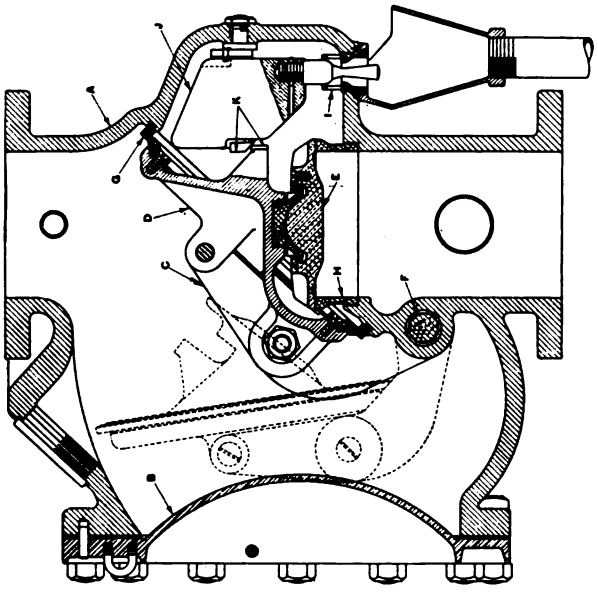

Fig. 1

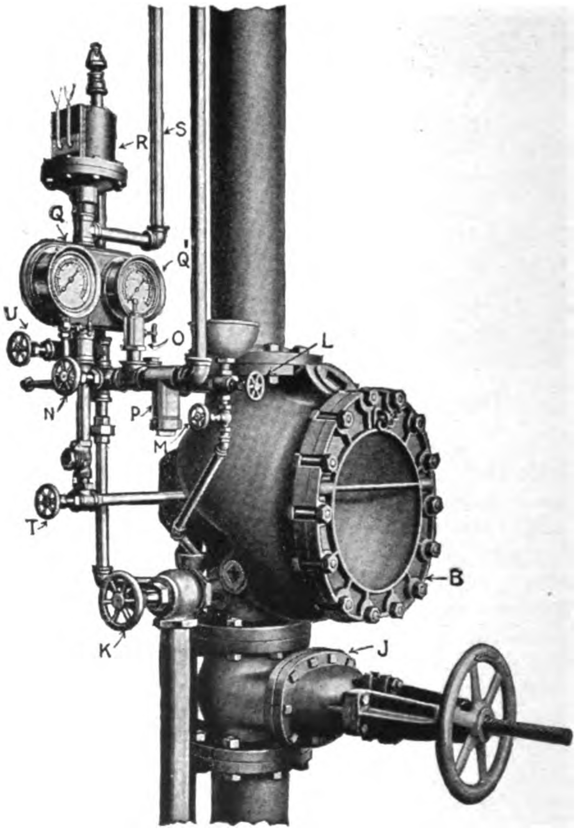

Fig. 2

tion of the valve is entirely independent of the latch.

Description and Explanation

Referring to Figure 1, "A" is the cast iron valve body moulded in one piece; "B" is a dished malleable cover closing a hand-hole conveniently located for setting and cleaning the interior parts. Two forged arms "C," directly in line with each other in Figure 2, and therefore appearing as one, cast iron member "D", to which they are bolted, and bronze water clapper "E" attached to "D", by means of the self-adjusting semi-spherical joint clearly shown, rotate as one piece about the bronze pin "F", and constitute the only essential moving member of the valve. The air joint is formed by rubber air valve "G" resting on a Babbitt seat, while "H" is the bronze water seat, raised well above the surrounding cast iron. The triangular space between the two seats is the intermediate chamber vented to the atmosphere through drip "I". Slight opening of the clapper permits latch weight "J" to fall, closing "I", and preventing reseating of the valve by engaging surfaces at "K".

The operation of the valve is so simple that a few words will suffice for explanation. When the escape of air through an opened sprinkler has caused the air pressure on the upper side of the rubber air valve "G" to fall to about one-sixth of the water pressure acting on the under side of the valve "E", the clapper rotates through a small arc from its shut position, shown in full lines, to its open position, shown dotted, drip "I" being closed by the falling of latch weight "J". This opening action occurs in a smooth and quiet manner without shock or jar at any service pressure and is completely accomplished down to about five pounds per square inch water pressure. Once opened the clapper cannot be reseated except manually after the removal of the hand-hole cover "B". In view of this it is evident that the main function of weight "J" is to close the drip "I", it being probable that no service conditions will be encountered that would require its functioning as a latch.

It has already been stated that the Model "C" valve will open when the air pressure has fallen to about one-sixth the water pressure, or, as it is usually expressed, it has a ratio of six to one, in common with its predecessors. In these latter the ratio has been obtained by making the area of the air valve six times that of the water valve, which, of course, must be the nominal size of the dry pipe valve, as, for example, six inches in diameter in a six-inch valve. An inspection of Figure 1 shows that the air valve of the Model "C" is but slightly more than three times the area of the water valve. The arrangement of the two valves is such, however, with respect to the axis of rotation "F", that the air pressure has the advantage of a leverage almost twice as great as that available for the water pressure. The introduction of this principle has resulted in a substantial reduction in size and weight.

Turning to Figure 2, the arrangement of the auxiliary piping and valves is seen. The use of these can best be explained by assuming that the dry pipe valve has operated to extinguish a fire, and that we are called upon to put it back into service. Valve "T" is found open, and water flowing past it from the intermediate chamber causes operation of the electric alarm by means of circuit closer "R", and continuing through "S" also operates the motor gong on the outside of the building. As we know of the existence of the fire these alarms have served their purpose, so we close valve "T". After making sure that the fire has been entirely extinguished, gate valve "J" is closed and "K" opened, thus draining the sprinkler pipe of water. Hand-hole cover "B" is next removed. This will be found easy to accomplish, as the bolt heads are held in slots, and the cover itself is chained to the valve body so it cannot fall. The rubber air valve, its Babbitt seat, the bronze water valve and its bronze seat are then carefully wiped and the clapper pushed forward until it falls into place. Next we raise the latch weight by means of the projection that extends through the drip valve opening as shown in Figure 1, and then replace "B", which is held on a short stud, so that both hands are free for inserting and tightening the bolts. This done, valve "L" is opened and water poured into the priming cup above it, the surplus being drained off through "M". With "L" and "M" closed, "N" is opened until gauge "Q" indicates that we have sufficient air pressure. Should we be careless and permit too much air to enter the system safety valve "O" will operate. Sediment strainer "P" prevents grit and scale from entering the dry pipe valve. After making sure that "T" is open and "K"-"L"-"M"-"N" and "U" closed, we open gate "J", thus placing the system in readiness for the performance of its duty when next called upon. The water pressure is indicated by the gauge "Q"; valve "U" is a test connection which when opened permits the flow of water to the circuit closer and the water motor alarm for purposes of trial.

The various models of Grinnell dry pipe valves, during the period of their use, have merited and received recognition as among the best devices of their kind. We believe that the Model "C" will do likewise and that it particularly serves in the important features of compactness, simplicity and dependability.

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F. W. WALKER GUEST OF HONOR

F. W. Walker, of the Beaver Falls Art Pottery Works, Beaver Falls, Pa., is touring the Pacific Coast as Commissioner of the United States Tile Association. He was the guest of honor recently at a luncheon given by the Commercial Club of Seattle, Washington, during which he gave an address on "The Latest Development in the Tile Business." The talk was illustrated by many splendid lantern slides. Mr. Walker, who is very well known to the industry, has been president of the American Ceramic Society. He is still active in the work of that organization.

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This is the Twentieth Century—it's bad form to say it "can't be done."

CANADIAN FOREST FIRES

Press reports of great forest fires which last month raged uncontrolled through northern Ontario indicate that from two hundred to five hundred lives have been lost. It is likely that many scores of injured persons will die. The flames "walked the territory" for hundreds of square miles, wiping out whole settlements and towns. Eight survived in one village of two hundred and eight inhabitants. Fifty-seven bodies were found in one railway cut. Sixteen were located in one pit. Twenty-four were taken out of one house. Relief workers in one section buried one hundred and thirty bodies in the course of a single morning's work, committing the dead to trenches. Nushka, Matheson, Cochrane, Iroquois Falls, Ramore, Porcupine Junction, Tashota, Kowocash, Timmons and other places contributed in awful numbers victims to the unconquerable Red Traveler, many of these points being totally effaced from the map. Refugees without food or clothing are "pouring into the larger towns south of the burned area. A large number of them have arrived at Englehart. Others have been sent to Cobalt and Haileyburg." Citizens in surrounding towns worked all day and night caring for the homeless wanderers. Officials of the Temiskaming and Northern Ontario Railway promptly adopted heroic measures toward the relief of those beggared by the flames. Many saved their lives by taking refuge in lakes and rivers, remaining in them for hours before they were able to start for the land.

Such is but a brief summary of the disaster. While this great loss of life is to be deeply regretted, it is perhaps better so than that the lumber be shaped into dwellings for burnable cities, where, one house started into flame, may result in the loss of thousands of dollars' worth of property, many lives, and the consequent crippling of millions of dollars in industry. Recall Salem and scores of other cities. The Canadian forest fires are but another lesson teaching the utter foolhardiness of "building to burn," teaching the great need of using modern materials of firesafe substance, teaching the criminally thoughtless American public to exercise and put into practical practice the building habits of modern European cities, teaching municipal authorities their real duty—teaching the world that wood is not "man's best building friend," that it is only "eternal" when kept away from the flames, that it is the "natural" material for the kitchen stove only, that its "beauty" is impractical and questionable when viewed alongside of charred and lifeless bodies. Architects, municipal authorities and the building public should consider the facts.

ANOTHER CEMENT PLANT

The Texas Portland Cement Company has constructed a $750,000 plant at Houston, Texas, which will use 725,000 pounds of shells taken from a deposit found along the gulf coast, and 100,000 pounds of clay shipped in from Pasadena each day.

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The construction of the mammoth Bassano Dam across the Bow River, 83 miles east of Calgary, Alberta, by the Canadian Pacific Railway Company, marks the completion of the largest concrete structure in Canada. The concrete portion of the dam is about 7,000 feet in length, and required about 1,000,000 cubic yards.

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DR. WASHBURN HEADS NEW CERAMIC STAFF

Dr. Edward W. Washburn, professor of ceramic chemistry and head of the department of ceramic engineering at the University of Illinois, was graduated from the Massachusetts Institute of Technology in 1905, and in 1908 was made a doctor of philosophy. All his time has been spent in the work of physical chemistry, and for eight years past he has been associated with the department of chemistry of the University of Illinois, contributing noteworthy efforts to science both as teacher and writer.

The department of ceramic engineering of the University of Illinois will this coming year offer unusual facilities to all interested in clayworking. The university has anticipated the demand for trained men resulting from the war. It offers a four-year course, covering the scientific and practical requirements of the industry. Advanced students will be afforded exceptional opportunities for research work.

The buildings and equipment, which have recently been made available for the work of the staff and students of the department of ceramic engineering, include a kiln-house equipped with batteries of oil-fired and coal-fired kilns and with heavier machinery for preparing clays, and a main building occupied as offices, recitation rooms and laboratories.

AMERICAN CERAMIC SOCIETY MEETS

The eighteenth summer meeting of the American Ceramic Society was held at St. Louis, Mo., on Wednesday, August 23, and concluded Friday evening. The members met at the New Washington Hotel, and at 930 left for the works of the Mississippi Glass Company, a plant of especial interest to ceramists for its manufacture of cathedral glass. The Hydraulic Press Brick Company's three plants were visited in the afternoon, the evening being spent informally.

On the 24th the visitors called at the Highland Fire Clay Company's plant, and also visited the factories of the Evans & Howard Company. The afternoon was occupied with calls at the Laclede-Christy Company's plant and the factories of the St. Louis Terra Cotta Company and the Winkle Terra Cotta Company.

Dinner was served at "The Highlands," the only amusement park in America operated in connection with a clay plant.

The party left the hotel on Friday, going to Alton by way of the Eagle Packet Company's Mississippi steamboat. Luncheon was served on the boat, which stopped four hours at Alton, allowing sufficient time for an inspection of the Alton Brick Company's kiln and the works of the Illinois Glass Company. The boat left Alton for St. Louis at 5 p. m., where the party disbanded.

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A guarantee is worth as much as the guarantor.

TO TEACH CONCRETE WORK

Wentworth Institute, Boston, is about to add to its courses of instruction, one on practical concrete work, having for its object the training of young men for the work of concrete foremen and contractors. The institute has set aside one of its best laboratory rooms for this concrete course and is fitting it up with modern testing machinery and other necessary equipment to make possible various determinations that will illustrate the technical as well as the practical sides of the applications of concrete. The first sessions will begin Monday, September 18.

This work has been made possible largely by the co-operation of the Portland Cement Association, the work having been planned by its extension division. J. G. Donaldson, field engineer of the extension division, will be located at Wentworth Institute for some time, assisting in the necessary preliminaries and afterward in starting and directing the course along the lines planned. A number of prominent engineers have lent considerable encouragement to this joint move on the part of the Portland Cement Association and Wentworth Institute, which gives added assurance of its success.

This departure is, in a sense, new for an institution of the class in which Wentworth Institute may justly be placed, yet it is only an extension of the manual training in concrete idea, which has demonstrated its popularity and appeal in numerous ways during the past year or more—perhaps most notably in the recent Short Course in Concrete for Manual Training and Vocational Teachers, which was held during the early part of the summer at Lewis Institute, Chicago.

◆

Cullen W. Parmelee, professor of ceramic engineering, graduated from Rutgers College in 1896, and for the past ten years has been professor of ceramics and director of the department of ceramics of that institution. He was trained as a chemist, and was an honor student in chemistry. He has sustained important consulting relations with various potteries, has contributed extensively to recent literature, and has the distinction of having served as president of the American Ceramic Society.

Ralph K. Hursh, assistant professor of ceramic engineering, graduated from the University of Illinois in mechanical engineering in 1908, and has been associated with the work of the department since 1911. His practical experience especially qualifies him for work with the coarser clays.

Howard C. Arnold, instructor in ceramic engineering, graduated from the University of Illinois in ceramics in 1914. He was an honor student at Illinois. He received the degree of master of arts from the Ohio State University in 1916.

◆

BUREAU'S REPORT SELLS CLAY FIELD

A striking example of the efficient help being rendered by the Bureau of Standards, Department of Commerce, is revealed in the experience of a citizen of Florida who thought that a cup of clay used in getting the turpentine from the trees might be better than those now used, as the present cups, made of another material, are causing trouble.

He forwarded a sample of the clay on his property, asking the Bureau to find out if turpentine cups could be made from it. Not only were good cups made, but experts of the Bureau found out that the clay was of an excellent quality for the manufacture of vitrified paving brick. And as a result of this information the Floridan is about to sell the property at a good figure to a brick manufacturer.

◆

CEMENT SHIPMENTS INCREASE

Eighty-six million eight hundred ninety-one thousand six hundred eighty-one barrels of Portland cement, valued at $74,756,674 at the mills, were shipped in 1915. The shipments in 1914 were 86,437,956 barrels, valued at $80,118,475. Finished cement made in 1915 totaled 85,914,907 barrels, which, compared to the barrels made in 1914, reveals a decrease of over 2½ per cent. In 1915 the average factory price per barrel was 86 cents, compared to 92 7/10 cents in 1914.

PROPERTIES OF CONCRETES

An instructive paper on the properties of concretes and Portland cement mortars, which is based on the recorded results of about twenty thousand tests and about three hundred aggregates consisting of limestone, granite, trap rock and gravel, used for concrete materials in different sections of the country, has just been issued by the Bureau of Standards, Department of Commerce, Washington, D. C.

One of the most important conclusions to be derived from the results is that the use of too great an amount of mixing water, which is common in present-day construction, accounts for many concrete failures. The use of an excessive amount of mixing water may result in a reduction in strength as great as would result from a reduction of 50 per cent in the amount of cement used. The results indicate that proper methods of mixing and fabrication are as important as good cement and aggregate in producing a concrete of the best quality.

◆

SHEET METAL MEN CHOOSE CLEVELAND

At the last annual convention, in the contest for the place of meeting for the 1917 convention Cleveland was an easy victor over Chicago and Peoria as the city which will gather the members of the National Association of Sheet Metal Contractors.

The election of officers resulted in the following choice for the ensuing year: President, George Harms, Peoria; first vice-president, Frank B. Higgins, St. Louis; second vice-president, Herman H. Lind, Cleveland; third vice-president, T. T. Walsh, San Antonio; fourth vice-president, Otto Guessenhainer, Milwaukee; secretary, Edwin L. Seabrook, Philadelphia; treasurer, W. A. Fingles, Baltimore.

There were also elected three trustees to serve for a period of three years.

◆

The National Fire Proofing Company has opened an office in the Builders' and Traders' Exchange, Grand Rapids, Mich., which is in charge of W. G. Campbell.

Fireproofing Information Bureau

¶In establishing this complete reference service, manufacturers and others producing catalogs, house organs, price lists, etc., are requested to forward their printed matter and samples and place CONSTRVCTION on their permanent mailing lists.

¶The FIREPROOFING INFORMATION BUREAU is intended for the use of resident and visiting architects, engineers, contractors and the general business and professional firesafe building fraternity, as well as prospective building owners, to whom its use will be extended gratuitously.

¶Every effort will be made to develop and maintain this Bureau to a high point of efficiency.

¶Prompt coöperation is solicited.

"CONSTRVCTION" TIMES BUILDING New York City

If you are a Manufacturer *of* Firesafe Material or Protective Devices,

consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advances and proves the argument for proper fireproofing

and

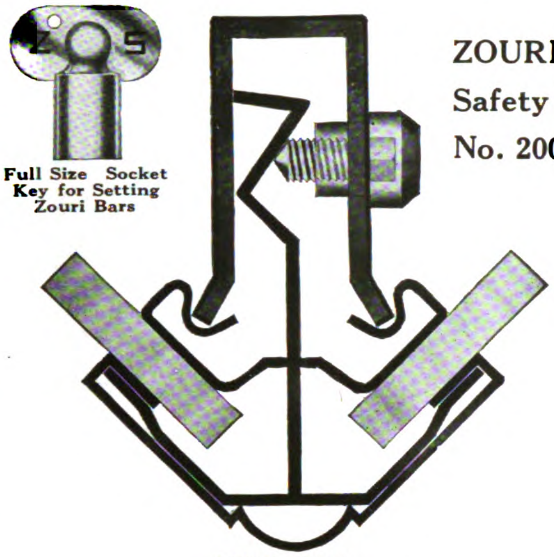
(2) what it actually accomplishes to increase the use of firesafe materials and devices.

The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building planning, construction, equipment and maintenance.

The second purpose is accomplished by *actively fighting for legislation favoring firesafe construction* and against laws permitting the continued use of wood——and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that *makers of fireproof materials are now getting but one per cent of the business which ought to be theirs*, that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the co-operation it merits.

ZOURI

Safety Store Front Construction



Full Size Socket Key for Setting Zouri Bars

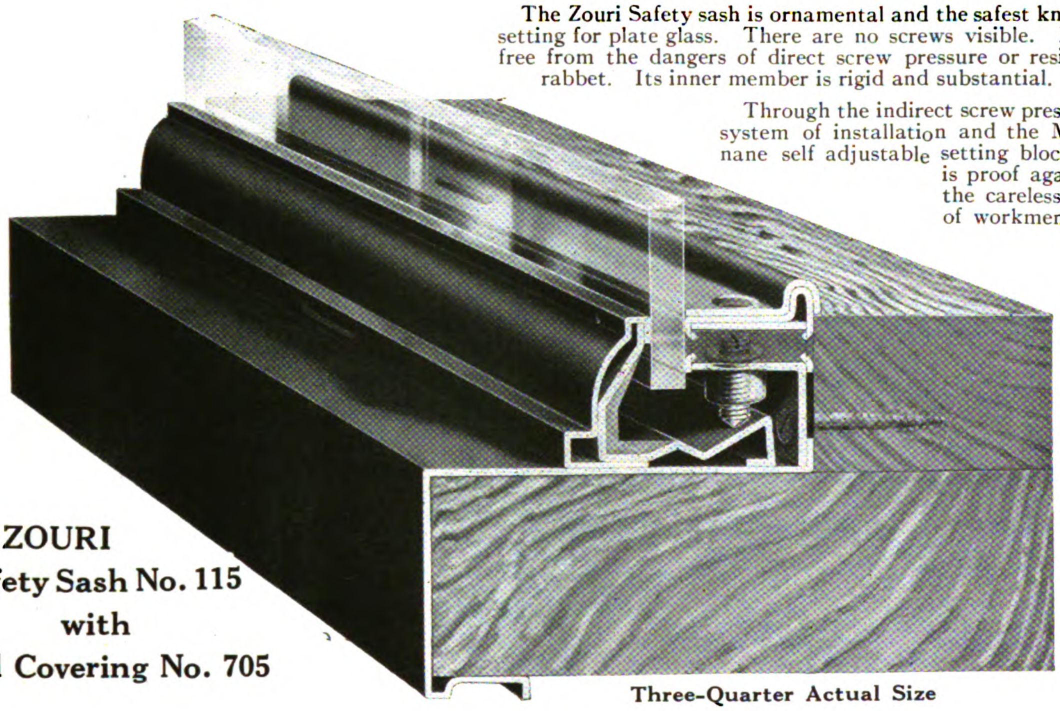
FULL SIZE

ZOURI
Safety **Key-Set Corner Bar**
No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilient rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



ZOURI
Safety Sash No. 115
with
Sill Covering No. 705

Three-Quarter Actual Size

DETAILS MAILED ON APPLICATION

Zouri Drawn Metals Company

1813-1833 East End Avenue Chicago Heights, Illinois

Operating under Murnane and Marr Patents

AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

REYNOLDS

FIRE APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS TRADE MARK H.M.R. ESTABLISHED 1868 **SAFE**

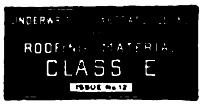
SHINGLES

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.



If your dealer cannot supply you write the factory.

H. M. Reynolds Asphalt Shingle Co.
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

One-half of a Brick is Service

You not only need brick for your Building Operation but you must have them when you want them.
We have anticipated the demands of a growing city.
Every year we increase our output and our service equipment.
We are now prepared for 1916 BUSINESS.

The Farr Brick Co.

Leader-News Bldg., Cleveland

Your Home is Known by the Company it Keeps

The selection of a site is all important.

When you buy, rent or sell real estate of any kind our services will help.

Our three offices offer unusual facilities to every client.

GENERAL REAL ESTATE

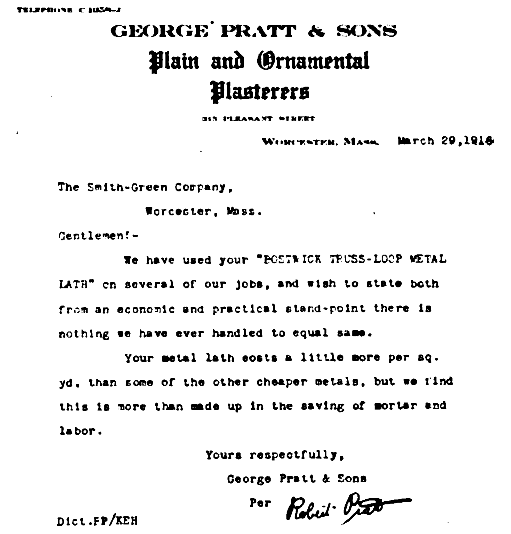
THE ONELLY CO.

Main Office:
Ground Floor, Williamson Building
CLEVELAND, OHIO

BRANCHES:
East Cleveland, 13592 Euclid Avenue
Lakewood, Corner Belle & Detroit Ave.

"BOSTWICK TRUSS-LOOP" METAL LATH

is not only fire resistant but, but also economical. See what a practical man says—



TELEPHONE C [illegible]

GEORGE PRATT & SONS
Plain and Ornamental
Plasterers
313 PLEASANT STREET

WORCESTER, MASS. March 29,1916

The Smith-Green Company,
Worcester, Mass.

Gentlemen:-

We have used your "BOSTWICK TRUSS-LOOP METAL LATH" on several of our jobs, and wish to state both from an economic and practical stand-point there is nothing we have ever handled to equal same.

Your metal lath costs a little more per sq. yd. than some of the other cheaper metals, but we find this is more than made up in the saving of mortar and labor.

Yours respectfully,
George Pratt & Sons
Per Robert Pratt

Dict.PP/KEH

THE BOSTWICK STEEL LATH CO.,
NILES, OHIO

Do Not Delay Building

Conditions for building never will be more favorable than at the present time.

Let your dream of that Safe Home be realized this year.

We sell every material for the Fire Resistive Building.

Service the best.

Cuyahoga Builders' Supply Company

SCHOFIELD BUILDING **CLEVELAND, OHIO**

. . The . .

BARKWILL BRICK CO.

BRICK and TILE

MADE RIGHT
SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

THE LAKEWOOD MASON SUPPLY CO.

DEALERS IN

BUILDERS SUPPLIES
and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const.Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

OFFICES AND WAREHOUSE:
HIRD AND NICKEL PLATE
LAKEWOOD, O.

for

Converts to Cooperation

Analyze this and the past numbers of Constrvction

Then ask yourself if you ever heard of anyone doing such real service for the fireproofing cause. It is our conception of vital boosting—this jumping right into legislative battles and fighting for ordinances favoring the use of fireproof material in building construction.

CONSTRVCTION is the only publication wholly devoted to consistent fireproofing—it is actively fighting for its constituents—it wants to be measured by the value of the good it accomplishes for your product.

Subscribe for CONSTRVCTION
Get Your Associates to Do Likewise

Help Us to Help You

STUCCO HOUSES

Cost Less Than Frame

Would you like to know how to build a **Stucco** house at less cost than frame?

Would you like to know how to save **33⅓** per cent in cost of the wall construction and get a fire-safe, more attractive, more durable house?

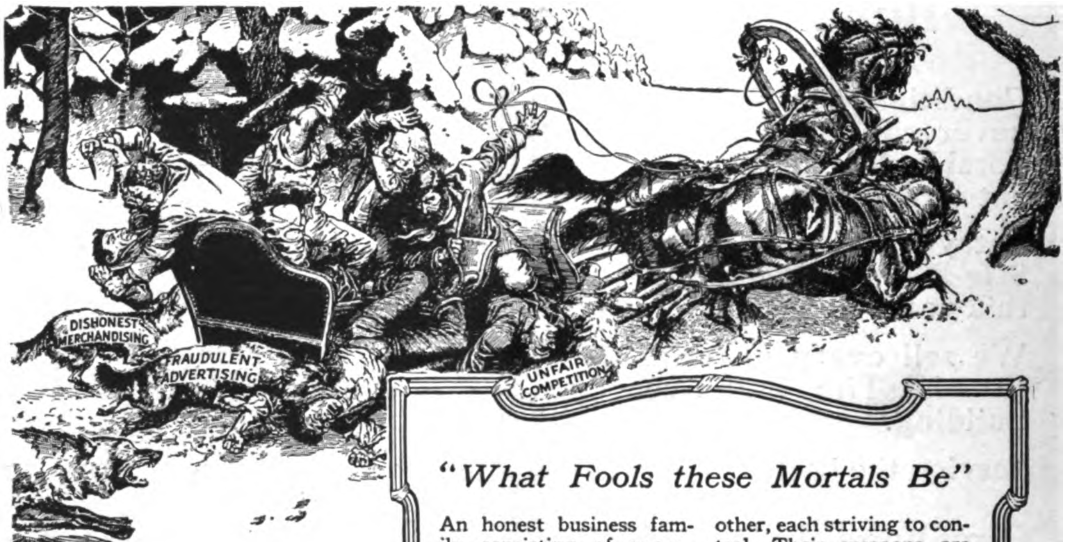
Then write to us today for full information, booklets and cost data on Stucco houses.

Let us prove our claim to you.

QUALITY SERVICE CLEVELAND BUILDERS SUPPLY CBS

The Cleveland Builders Supply Co.
Cleveland, Ohio

SOCIETY ADVOCATING FIRE ELIMINATION SAFE



"What Fools these Mortals Be"

An honest business family, consisting of manufacturers, jobbers and retailers, is driving through the forest of distribution to the market place. The woods are beset with hungry wolves, and the only safe route is along the well-marked road of intelligent advertising. The driver is a safe and experienced Advertising director and the members of the party are armed with cash resources, ability and experience, with which they may fight their common enemy, the wolves. They are all anxious to obtain the profits awaiting them at the market place and they show some impatience at the time the journey requires. Finally there is a dispute as to a shorter course to be followed. The manufacturer, the jobber, the retailer and the consumer, each insists on dictating the way. Suddenly they seize the reins and the frightened horses plunge off the established road. Then the men attack each other, each striving to control. Their weapons are turned against each other and immediately their common enemies, Fraudulent Advertising, Dishonest Merchandising, and Unfair Competition come closer to the sleigh. The wolves realize that their victims are being prepared for them. Their jaws snap eagerly in anticipation of the feast. It is evident that the entire party is doomed if the family conflict continues. One by one the members will be dragged down by the wolves. Their fate is inevitable—but harken! Hear those shouts at a distance! Another party is approaching at top speed! There is yet hope, for it is the Vigilance Patrol maintained by The Associated Advertising Clubs of the World. Business will be rescued! The guns of the truth-in-advertising forces will be turned on the marauders and the family will be conducted to the safety of public confidence.

This is one of a series to Advertise Advertising—by the Associated Advertising Clubs of the World (headquarters Indianapolis). The illustration is used through the courtesy of the publishers of "Puck" The text was prepared by Merle Sidener, chairman of the National Vigilance Committee of the Associated Advertising Clubs. Write for booklet, written for buyers like yourself. Every man or woman who buys any kind of commodities will find it profitable reading.

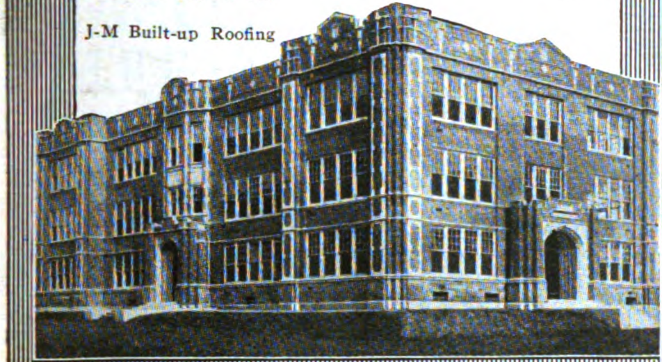
ASSOCIATED ADVERTISING CLUBS OF THE WORLD
TRUTH

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

J-M Products are not only the result of experience and expert workmanship on materials of the highest grade, but have behind them the backing of J-M Service and Responsibility. They *must* give absolute satisfaction in service.

H. Russ Warner
Architect
Charlestown, W. Va.

J-M Built-up Roofing



Science Hall, Marshall College, Huntington, W. Va.

J-M Asbestos Roofing

owes nothing to the Paint Pot for its long life—It's in the Roofing

And that's the big difference between J-M Asbestos Roofing and the roofing which must be reinforced by paint, stone and slag for its protection from wear and weather.

The fire-resistant and time-resistant properties of J-M Asbestos Roofing are a part of the warp and woof of the roofing itself.

—a solid homogenous felt of two mineral materials—J-M Asbestos Fibre and Trinidad Lake Asphalt. That's why it never needs painting or any other coating. It lasts because every fiber is like every other, equally impervious to all conditions that affect other roofings.

J-M Asbestos Roofing is examined, approved, and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

H. W. Johns-Manville Co.

Executive Offices, 296 Madison Ave., New York

Branches in all large cities

POMEROY FIRE RETARDANT WINDOWS

Not Made to Meet a Price, but to Set a Standard of Service

WHETHER the ventilation that a window affords is a virtue or a vice, depends upon the window maker. Certainly any window that furnishes constant and uncontrolled ventilation, by admitting air at all times about its ill-fitting frames and casings, cannot be considered a good window—nor is it a good investment of an owner's money. A good window opens easily, on occasion, to give the ventilation wanted. And it closes easily and tightly—and stays tight—when it is desired to shut out the weather. One of the fine points of window wisdom is to recognize—and to utilize—good windows that give controlled ventilation. **Pomeroy** Windows are good windows in this respect as in all others.

Ask Us To Show How and Why

SAMPLES FILED WITH ARCHITECTS SAMPLES CO NEW YORK CITY

S. H. POMEROY
COMPANY, INC.
30 EAST 42ND STREET NEW YORK

A Bank Must be Safe

—not only financially but structurally as well.

It houses treasures, securities and records—the safe-keeping of which must be beyond question.

A bank cannot afford to make a mistake. Therefore, it entrusts the important work of modern construction to architects and contractors of reputation.

They safeguard this reputation by specifying NATCO Hollow Tile and taking full advantage of the Natco Engineering Service.

NATCO provides

- —absolute safety and protection from fire.
- —safety in physical structure; combined strength and minimum lightness, and reduction in structural steel requirements.
- —a saving both in first cost, and through ease and speed of erection.
- —safety from discomfort; giving greater warmth in winter (with heating economy), and coolness in summer. Soundproof, damp-proof, vermin-proof.

Complete information on the ideal. NATCO-way of building safely, can be obtained from the nearest office.

Franklin National Bank Building, Philadelphia, Pa. Furness, Evans & Company with McKim, Mead & White, Associated—Architects.

Arches, girder covering, partitions, furring and column covering—all of NATCO Hollow Tile. Over 2,000 tons of

NATCO HOLLOW·TILE

used in construction. "The material that made the skyscraper possible."

NATIONAL·FIRE·PROOFING·COMPANY
390 FEDERAL STREET PITTSBURGH, PA.

Offices also at: NEW YORK CHICAGO BOSTON PHILADELPHIA WASHINGTON DETROIT SYRACUSE
23 Factories in the United States, and also at Hamilton, Ont., Canada

NATCO

THE TECHNICAL FIRESAFE BUILDING PUBLICATION

"It costs less to prevent fires than to pay losses"

OFFICIAL JOURNAL OF SOCIETY ADVOCATING FIRE ELIMINATION

CONSTRVCTION

WITH A
DEPARTMENT DEVOTED TO

SAFE HOMES

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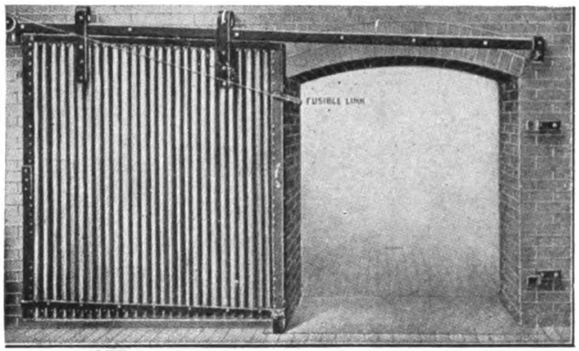
Entered as second-class matter November 8, 1915, at the post office at New York, under the Act of March 3, 1879.

SUBSCRIPTION PRICE—TWO DOLLARS THE YEAR IN U. S. A.

Saino
SHEET METAL FIRE DOOR

Labeled by Underwriters' Laboratories.



Saino All-Metal Fire Doors and Shutters

Light, Rigid, Indestructible! Built for daily use. No wood to rot; no tin to rust; no repairs. Seventeen years without a replacement from fire, rust or rot.

SAINO FIRE DOOR AND SHUTTER CO.
2025 ELSTON AVE., CHICAGO, ILL.

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

Kno-Burn
TRADE MARK
Expanded Metal Lath

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

North Western Expanded Metal Co.
Manufacturers of all types of Expanded Metal
958 Old Colony Bldg., Chicago, Ill.

If you are a Manufacturer *of* Firesafe Material or Protective Devices,

consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advances and proves the argument for proper fireproofing
and
(2) what it actuall accomplishes to increase the use of firesafe materials and devices.

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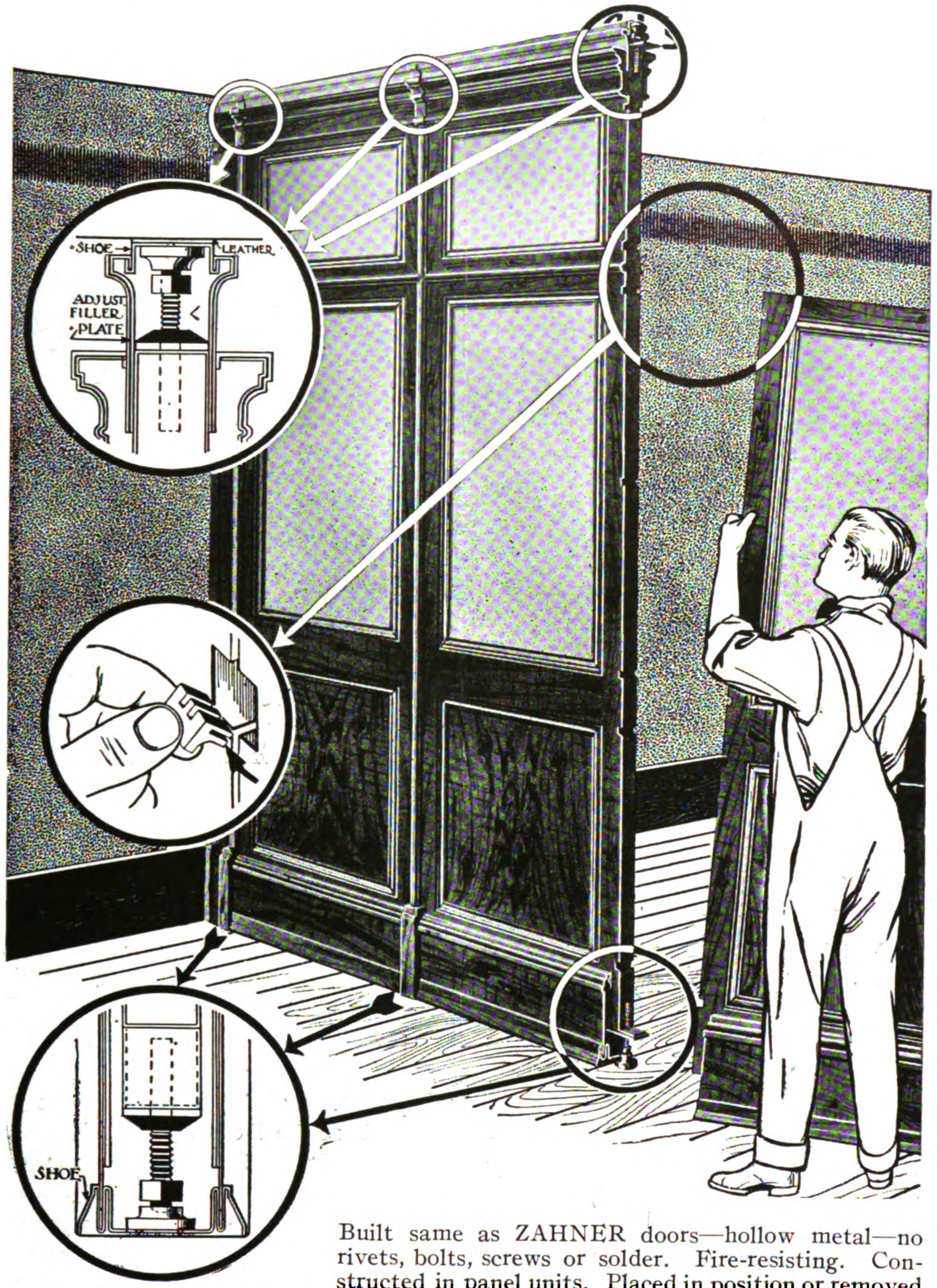
ZAHNER

A perfect portable partition



Built same as ZAHNER doors—hollow metal—no rivets, bolts, screws or solder. Fire-resisting. Constructed in panel units. Placed in position or removed in a fraction of the time necessary for any other partition. No hammering—no wedging—no nails. A wrench the only tool needed. No marring the floor, walls or ceiling. Adaptable to any conditions. Write us.

THE ZAHNER METAL SASH AND DOOR CO.

CANTON

THE CITY OF DIVERSIFIED INDUSTRIES

New York Office, 42nd Street Building **Agents in All Principal Cities**

School Building, Winslow, Me. Architect, J. R. Dean, Architect and Engineer, Winslow, Me. Contractors, Cyr Bros., Waterville, Me.

"The Metal Lumber construction was a saving over other fireproof constructions I had in mind when originally designing this building."

THE above statement was made by Mr. Dean, Architect and Engineer, when referring to the construction used in the above building.

Metal joists, studs and furring were used throughout for floors, roof, suspended ceilings, partitions and exterior wall furring.

Berger's
Metal Lumber

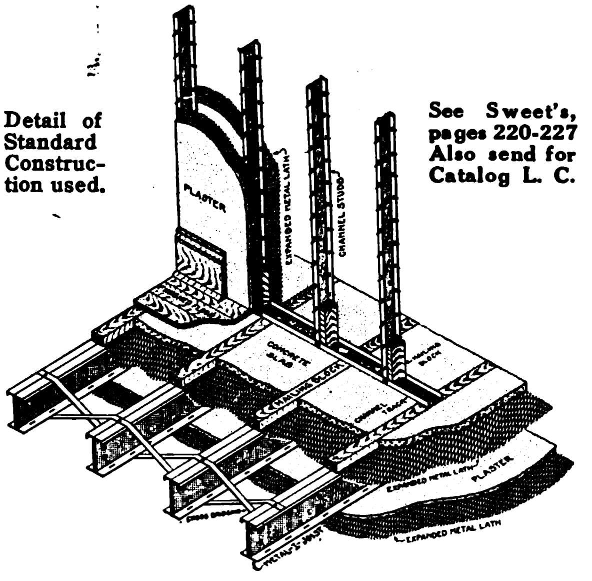
(Patented)

is made from a special analysis heat-treated, double-grained steel. It is the ideal, structural material—safe, durable and economical. Adaptable to any building and any climate.

Proven by official, practical fire, load and water tests to be ***fireproof*** and ***indestructible.*** We cut and number each unit to fit your plans, making erection easy and speedy.

The Berger Mfg. Co., Canton, O.

Branches: Boston, New York, Philadelphia, Chicago, St. Louis, Minneapolis, San Francisco, Los Angeles.
Export Department: Berger Bldg., New York City, N.Y., U.S.A



Detail of Standard Construction used.

See Sweet's, pages 220-227 Also send for Catalog L. C.

"The Largest Fire Insurance Company in America"

ORGANIZED 1853

THE HOME INSURANCE COMPANY NEW YORK
HOME

ELBRIDGE G. SNOW, President

"Service" in Fire Insurance

Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.

It means a "SERVICE" to Policyholders which is unexcelled. The Company's equipment includes:

1. Experts in every branch at its Head Office and in the Field.
2. Agents throughout the United States and its possessions, and in Canada, to write Policies.
3. Complete facilities for the Prompt Adjustment of Losses.

The advice which may be had gratis from the Department of Improved Risks, located at the Head Office, will be found especially valuable to large insurers.

Ask any "HOME OF NEW YORK" Agent, or address inquiry to Department of Improved Risks, 56 Cedar Street, New York City.

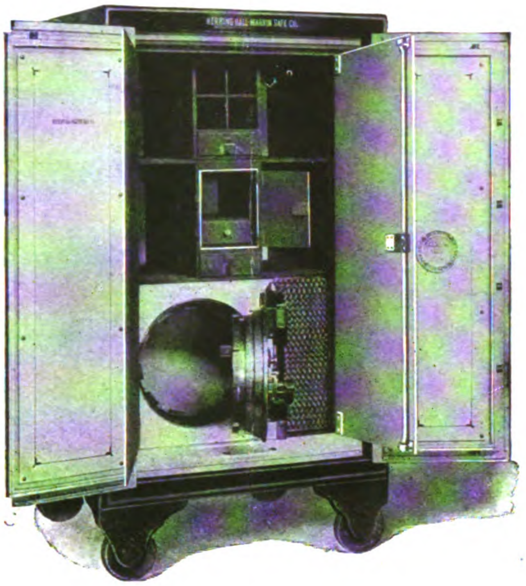
ALL BRANCHES OF FIRE INSURANCE

Automobiles, Commissions, Hail, Marine (Inland and Ocean), Parcel Post, Profits, Registered Mail, Rents, Sprinkler Leakage, Tourists' Baggage, Use and Occupancy, Windstorm.

STRENGTH REPUTATION SERVICE

HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



Fireproof and Burglarproof

SAFES, VAULTS & SAFE DEPOSIT BOXES

For Offices, Residences, Banks and Bankers

We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.

Plans and Specifications furnished without cost

Executive Offices
400 B'way, New York

Factories
Hamilton, Ohio

Branches
Boston, Mass. *San Francisco, Cal.* *Chicago, Ill.*
Birmingham, Ala. *New York, N. Y.*

"Build it of Standard Products
—Make it Consistently Firesafe"

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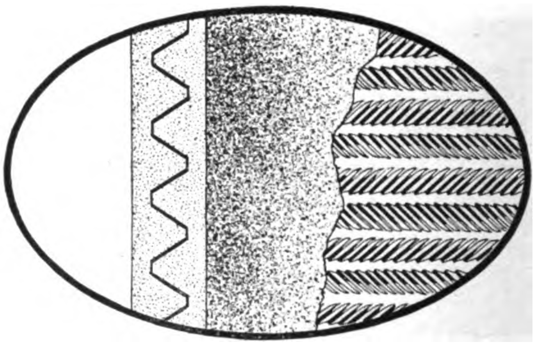
Are You Boosting For
Fire Prevention Preparedness?

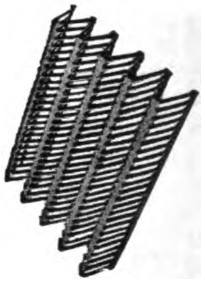


"Trussit"

Walls and Partitions

Strong — Light — Economical— Fireproof

Strong—because the metal is uniformly expanded and so interwoven back and forth through the cement or plaster that it forms an integral part of it.



Light—Trussit permits the erection of partitions but two inches in thickness that are wonderfully rigid, and of curtain walls the equal of brick or poured concrete at a fraction of their cost.

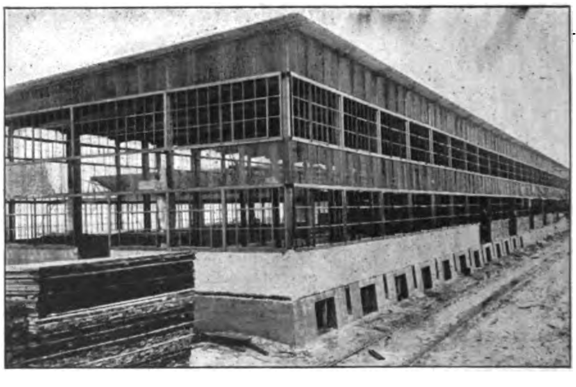
Economical—Saves time and labor by eliminating permanent studding; and its great rigidity permits the erection of light walls and partitions with a saving of materials.

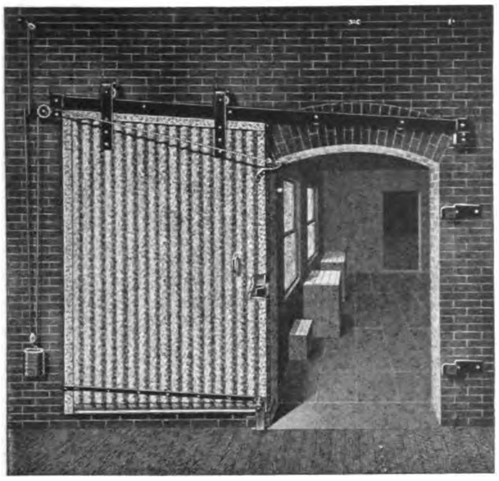
Fireproof—Trussit used as a reinforcement for curtain walls and partitions gives fireproof construction at a much lower cost than brick, tile or poured concrete.

Write for the "Fireproofing Handbook" which illustrates and gives specifications for the use of Trussit.

The General Fireproofing Co.
810 Logan Ave., Youngstown, Ohio

Utica Heater Co., Whitesboro, New York
Trussit Walls in Construction





Typical Installation—Single Sliding Type

HIGHEST APPROVALS

Underwriters' Laboratories,
CHICAGO, ILL.

Factory Mutual Laboratories,
BOSTON, MASS.

EVANS "ALMETL" FIRE DOORS AND SHUTTERS
(PAT. PENDING)

THE WORLD'S STANDARD

The Evans "Almetl" Fire Doors and Shutters are made throughout of Steel (or ingot iron) and lined with Asbestos Roll Board.

LIGHT
STRONG
DURABLE
ATTRACTIVE

ABSOLUTELY THE BEST BUILDING OPENING COVERING NOW ON THE MARKET.

Easy to install. Cost nothing to maintain. No wood to rot or burn. No tin covering to bruise.

Accepted and recommended by National, State and Municipal authorities in New York, New Jersey, Pennsylvania, Connecticut, Illinois, Washington, D. C.

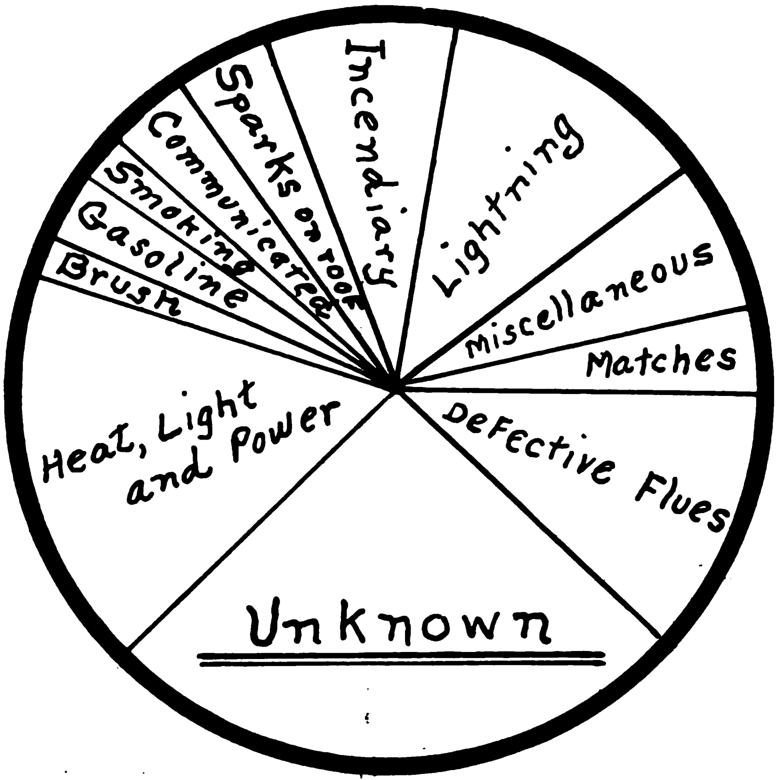
Other Fire Prevention Lines

Fire Retarding "Star" Ventilators
Fire Resisting Roofing Tin
Metal "Spanish" Tiles
Metal "Gothic" Shingles

MERCHANT & EVANS CO.
PHILADELPHIA

New York	Atlanta	Cleveland	St. Louis
Baltimore	Wheeling	Chicago	Kansas City

"Fires of Unknown Origin"



The above graphic chart illustrates the ratio of destruction by fires of unknown origin to the total amount of fires in the State of Wisconsin during the year ending June 30th, 1915, as shown by the report of the State Fire Marshal. In this State the recorded destruction by fire for the year was $4,364,195, of which $1,001,455 was caused by fires of unknown origin.

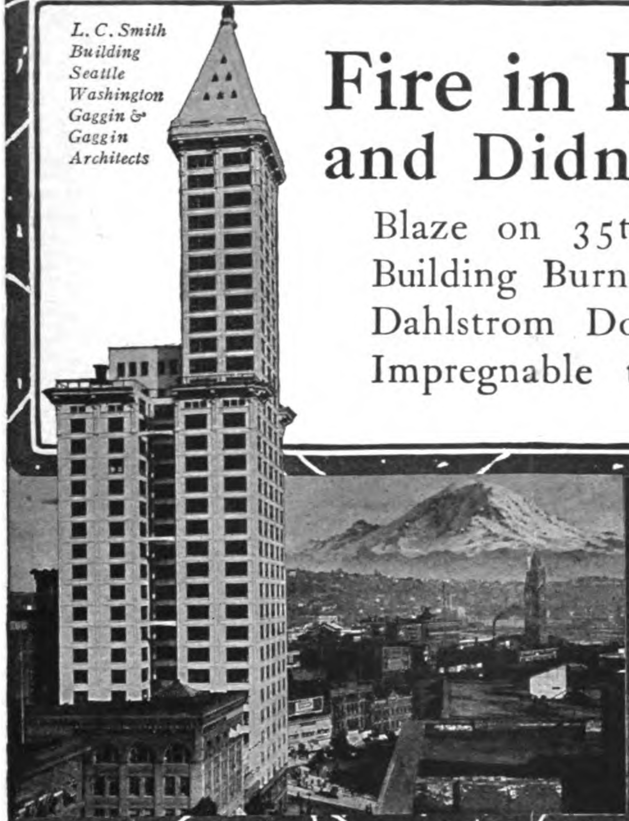
–Impossible When "Aero" is Installed

AERO AUTOMATIC FIRE ALARM SYSTEM discovers a fire in its incipiency and promptly sends out the alarm. Gives warning before the fire gets beyond control; summons help, when help is most needed, in the first stages of a fire—when it can be extinguished before serious damage has been done.

Investigate "Aero" Fire Protection. It is the most efficient least costly method you can install.

AERO FIRE ALARM COMPANY

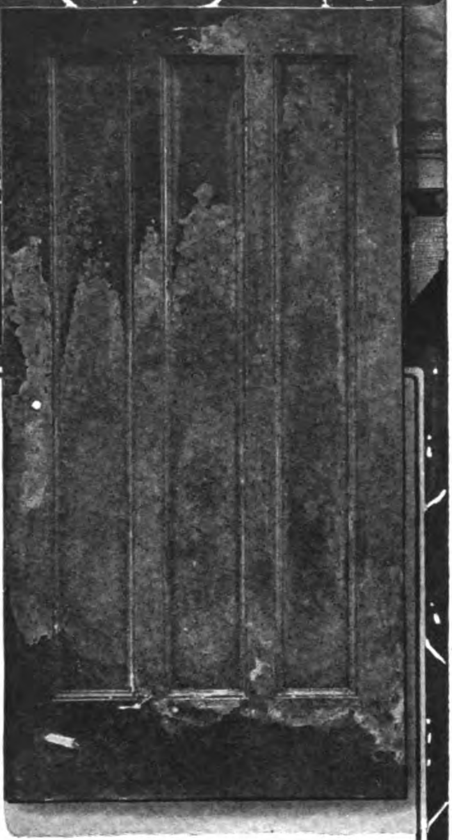
Havemeyer Building, 26 Cortlandt Street, New York



L. C. Smith Building Seattle Washington Gaggin & Gaggin Architects

Fire in Pipe Shaft and Didn't Know It

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.



Door Finish Only Damage Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.

The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.

Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire.

Your responsibility ends with the installation.

*Write for **all** the facts.*

DAHLSTROM PATENT DOOR ARTISTIC EVERLASTING SANITARY AND FIREPROOF

THE DAHLSTROM METALLIC DOOR CO.
Executive Office and Plant, 61 Blackstone Ave., Jamestown, N. Y.
New York Office, 130 East 15th Street

Residence of Mr. H. Fisk, Green Bay, Wisconsin. Architects: Foeller & Shober, Green Bay, Wisconsin. Roofed with Ambler Asbestos Shingles "Century Brand"

This Roof Emphasizes the Artistic Attributes of

Ambler Asbestos Shingles, "Century Brand." In this instance, they were chosen as much to complete the tasteful contrasts predominant throughout the building, as for their fire-proofing and last-forever qualities.

AMBLER
Asbestos CENTURY BRAND Shingles

The Roof That Is As Permanent As The Foundation

This roof will remain intact throughout the life of the building. The repairs incident to slate, tile and tin roofs are eliminated. Preservatives and paint are never necessary. A peculiar quality of asbestos is that it becomes harder, tougher and improves in serviceability and appearance under the weathering influence of the elements. Its light weight also effects an additional economy both with respect to rapidity of roof construction and the use of lighter timber than is possible in connection with slate or tile.

Ambler Asbestos Century Shingles are made of the best grade Portland cement, reinforced by Asbestos fibre, the whole thoroughly integrated by special process to secure a dense, uniform, homogeneous texture. They will not crack or split. They obtain in various shapes and in three colors—Newport Gray, Indian Red, Blue Black, making possible those combinations peculiarly identified with certain types of buildings. They serve the artistic requirements from cottage to castle and are in use by this and foreign governments.

Send for the evidence of Artistic and Structural attainment as contained in our illustrated catalog.

KEASBEY & MATTISON CO., Dept. B-3, Ambler, Pa., U.S.A.

CONSTRUCTION

WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

VOL. III OCTOBER, 1916 No. 4

The Use of Portland Cement in Firesafe Homebuilding

By C. Stanley Taylor

The following article, which treats of the use of Portland cement in the forms of stucco, reinforced concrete and concrete blocks in the construction of common sense firesafe homes, together with the use of metal lath in this connection, is the first of four general articles in the Common Sense Home Building Series which have been written for the purpose of explaining in a simple matter to home owners, both present and prospective, the proper uses of cement, brick, terra cotta building tile, and gypsum in homebuilding

As the use of cement has been treated in this article, so will the uses of brick, hollow tile and gypsum be detailed in articles to appear in the December, January and February issues of this publication

AS we enter more deeply into a comprehensive study of the activities of the homebuilders of America, we are impressed by the fact that the inherent use of wood so peculiar to this nation is rapidly being superseded by the common-sense use of unburnable materials, particularly in the construction of the roof, walls, floors and partitions of the home.

Having carefully considered the question of unburnable roofing in a recent article in this publication, the subjects which naturally present themselves for consideration are those of the practical firesafe construction of exterior walls, floors (particularly the ground floor) and principal partitions of the house.

From a practical standpoint it is not urged that wood be entirely excluded from the home. Hollow metal trim and doors, while equalling in beauty the natural finish of fine woods, are not within the reach of the pocket book of the average homebuilder. Nor has the art of metal furniture making produced practical metal furnishings for the home at moderate prices. Therefore, accepting the use of wood in various forms in the interior of the home, the practical man will seek to make the *exterior* of his house proof against communicated fire; and to so cut off the interior by the use of unburnable floors and principal partitions that the rapid spread of flames will be impossible. In this manner the lives of the family will be safeguarded and the possibilities of getting at and extinguishing the flames before serious damage is done are many times increased.

While it is true that the tendency of the homebuilding public is toward the use of masonry exteriors, it is also true that the value of the fire-resisting qualities of these materials, and the dangers attending the use of wood, are not clearly realized. Nor has the man-about-to-build a proper conception of costs.

As great conflagrations sweep our cities, usually originating or spreading through frame residential districts, some few of our citizens are aroused to the danger of the wooden exterior. So, too, are others convinced of this danger by the efforts of various fire-prevention organizations and mediums. Thus, slowly, the lesson is being taught.

To-day, the average citizen builds of brick, or clay tile, or stucco, or concrete, because he likes its appearance. It is more durable and expensive looking and reflects the spirit of modern times. All this is true and has distinct value in encouraging the demand for these materials for home building, but more and more will added stress be laid on the importance of their fire-resisting qualities as our people realize more fully the fallacy of *building to burn.*

The matter of increased cost for masonry construction is very greatly over-rated in the mind of the average citizen. The man with a few thousand dollars to spend in the construction of a home is naturally anxious to buy all that he can for his money in the way of pretentiousness and practical arrangement. The house of wood throughout is undoubtedly the cheapest in actual first cost, which is naturally popular opinion and has a great effect in the selection of this material for the construction of the home; but there are two exceedingly important points that are rarely realized by the average prospective homebuilder. These are, first, that the *ultimate cost* of a frame house, due to rapid deterioration and increased cost of maintenance, is far greater than that of a house of masonry; and, second, that the greatly feared higher cost of a masonry exterior for the home only varies from 2 per cent to 13 per cent above that of wood.

As proof of this assertion we print the following tables from an article by J. Parker B. Fiske, entitled "The Cost of a House," as published in the report of the Committee on Fire Prevention of the Boston Chamber of Commerce, September, 1911. (See page 208.)

The various types of outer wall construction, as shown in the tabular comparisons, were as follows, all other details of the proposed house being common to all types:

Description of Various Types of Outer Wall Construction

Type 1. Frame covered with boards and finished with clapboards over building paper; inside surface furred, lathed and plastered.

Type 2. Frame covered with boards and finished with shingles over building paper; inside surface furred, lathed and plastered.

Type 3. A 10-inch brick wall, i. e., two 4-inch walls tied together with metal ties and separated by a 2-inch air space inside surface, plastered directly on the brickwork. Face brick to cost $17.50 per M., inside brick, $9 per M.

Type 4. A 12-inch solid brick wall; inside surface furred, lathed and plastered. Face brick to cost $17.50 per M., inside brick, $9 per M.

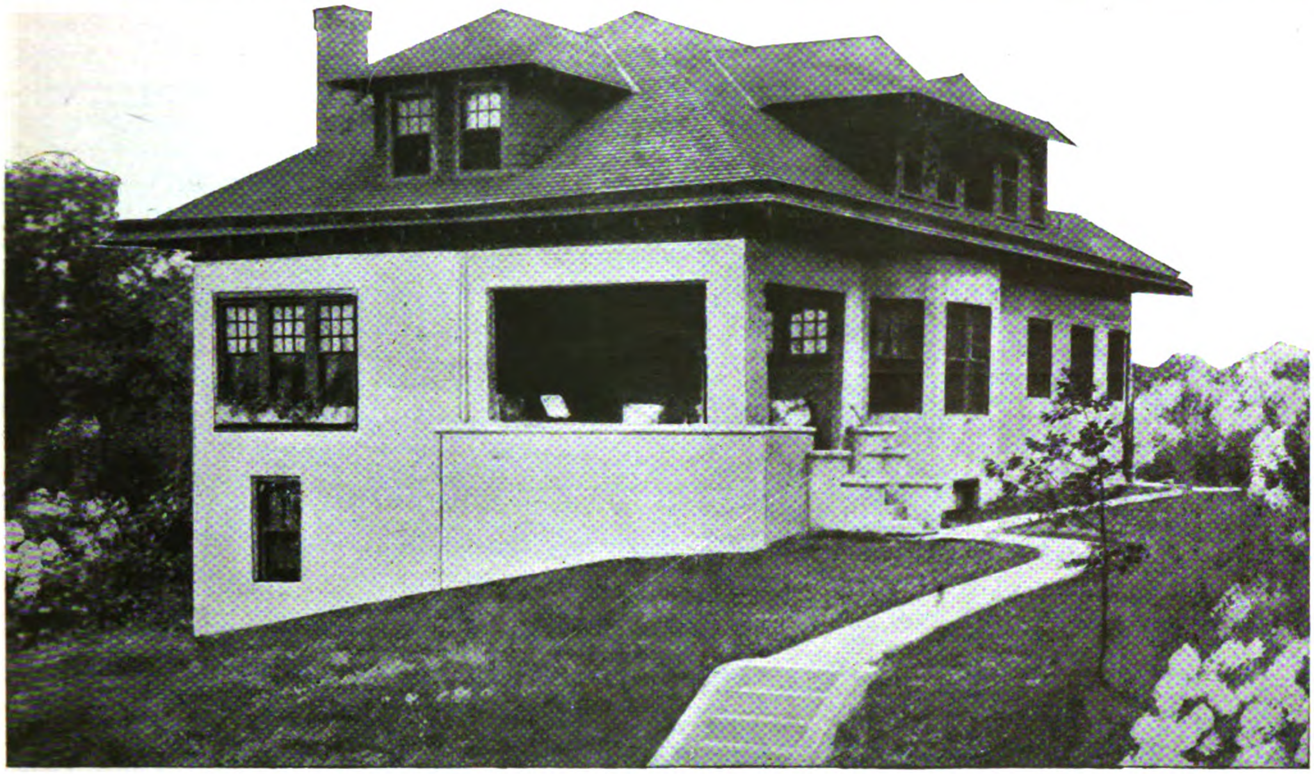
Type 5. Eight-inch hollow terra-cotta blocks, stuccoed on the outside and plastered directly on the inside.

Type 6. Six-inch hollow terra-cotta blocks, finished with a 4-inch brick veneer on the outside and plastered directly on the inside. Face brick to cost $17.50 per M.

Type 7. Frame covered with boards and building

Courtesy, Bostwick Steel Lath Co.

Firesafe and comfortable homes



Courtesy of Alpha Portland Cement Co.

A well-designed reinforced concrete dwelling

paper, furred and covered with stucco on Clinton Wire Cloth; inside surface furred, lathed and plastered.

Type 8. Frame covered with boards (building paper omitted), and finished with a 4-inch brick veneer on

Courtesy of Alpha Portland Cement Co.

A splendid example of "concrete for permanence" in home building the outside; inside surface furred, lathed and plastered. Face brick to cost $17.50 per M.

Type 9. Frame finished on the outside with a 4-inch brick veneer tied directly to the studding (boarding omitted); inside surface furred, lathed and plastered. Face brick to cost $17.50 per M.

The figures in the following tables show actual relative costs of common types of exterior wall construction and are not estimates, but *bona fide* bids made by reputable contractors and substantiated by guarantees.

COLORED MORTARS

Colors Given to Portland Cement Mortars Containing 2 Parts River Sand to 1 Cement

Dry Material Used	Weight of Dry Coloring Matter to 100 Pounds of Cement			
	½ Pound	1 Pound	2 Pounds	4 Pounds
Lamp Black	Light Slate	Light Gray	Blue Gray	Dark Blue Slate
Prussian Blue	Light Green Slate	Light Blue Slate	Blue Slate	Bright Blue Slate
Ultra Marine Blue	....	Light Blue Slate	Blue Slate	Bright Blue Slate
Yellow Ochre	Light Green	....	....	Light Buff
Burnt Umber	Light Pinkish Slate	Pinkish Slate	Dull Lavender Pink	Chocolate
Venetian Red	Slate, Pink Tinge	Bright Pinkish Slate	Light Dull Pink	Dull Pink
Chattanooga Iron Ore	Light Pinkish Slate	Dull Pink	Light Terra Cotta	Dull Brick Red
Red Iron Ore	Pinkish Slate	Dull Pink	Terra Cotta	Light Brick Red

From Cement and Concrete, Louis Carlton Sabin; McGraw Publishing Co., N. Y.

Mortar Coloring Table (See Page 214)

COMPARATIVE BIDS

Type No.	1	2	3	4	5	6	7	8	9
Description	Clapboard	Shingle	10-inch Brick Wall Hollow	12-inch Brick Wall Solid	Stucco on Hollow Block	Brick Veneer on Hollow Block	Stucco on Frame	Brick Veneer on Boarding	Brick Veneer on Studding
Bid No. 1	$6,732.00	$.......	$7,572.00	$.......	$7,416.00	$7,777.00	$6,857.00	$7,130.00	$7,080.00
Bid No. 2	6,235.76	6,370.40	6,736.48	7,105.00	6,491.23	6,762.83	6,410.00	6,746.20	6,664.88
Bid No. 3	6,692.00	6,786.00	7,118.00	7,418.00	7,179.00	7,238.00	6,847.50	6,970.00	6,895.00
Bid No. 4	6,690.00	....	7,496.00	7,801.00	7,202.00	7,648.00	7,000.00	7,496.00	7,420.00
Bid No. 5	7,450.00	7,450.00	7,940.00	8,240.00	7,650.00	7,990.00	7,650.00	7,790.00	7,710.00
Average of bids	6,759.95	6,868.80	7,372.48	7,641.00	7,187.65	7,483.16	6,952.00	7,226.44	7,153.98

COMPARATIVE BIDS

Percentage Excess Cost of Each Type Over Clapboards

Type No.	1	2	3	4	5	6	7	8	9
Description	Clapboard	Shingle	10-inch Brick Wall Hollow	12-inch Brick Wall Solid	Stucco on Hollow Block	Brick Veneer on Hollow Block	Stucco on Frame	Brick Veneer on Boarding	Brick Veneer on Studding
Bid No. 1	.0	....	12.5	....	10.2	15.5	1.9	5.9	5.2
Bid No. 2	.0	2.1	8.0	13.9	4.1	8.4	2.8	8.2	6.9
Bid No. 3	.0	1.4	6.4	10.8	7.3	8.2	2.3	4.2	3.0
Bid No. 4	.0	....	12.0	16.6	7.7	14.3	4.6	12.0	10.9
Bid No. 5	.0	.0	6.6	10.6	2.7	7.2	2.7	4.6	3.5
Average of bids	.0	1.6	9.1	13.0	6.3	10.7	2.9	6.9	5.8

House

In the matter of firesafe exteriors, floors and partitions we have then for consideration three general classes of materials: Portland cement in various forms (which entails the use of metal lath); hollow clay tile; and brick.

How Portland Cement is Used

Portland cement is used in the building of firesafe homes in the form of concrete, stucco and cement blocks. In the following paragraphs we will consider each form of construction in detail. Concrete construction needs little in the way of definition, consisting, as it does, of walls, partitions, floors, and even roofs composed of a mixture of cement, sand and pebbles, or crushed stone all mixed with water and poured while in plastic condition into forms containing proper reinforcing already set up, or in some cases, into patented metal forms, which automatically become reinforcing and binding members.

Stucco is an exterior finish of cement plaster, which is applied as a covereing to the framework of wood or steel, or to walls of brick or terra cotta. In this manner the stucco house is distinguished from the true concrete house, although both may present similar exterior appearance.

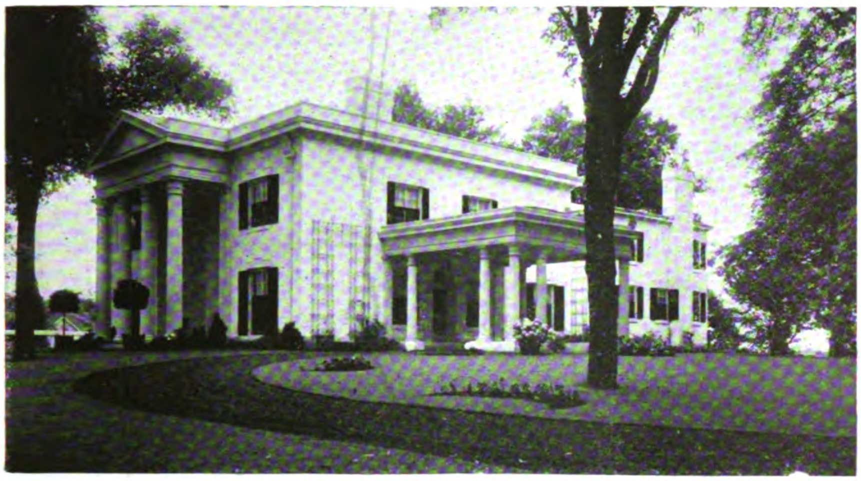
Portland cement is also used to some extent in the form of concrete blocks, which, as the name implies, are building blocks of various patented forms, which are usually made by special machines on the job and erected to form walls giving the appearance of hewn stone or surfaced in other styles.

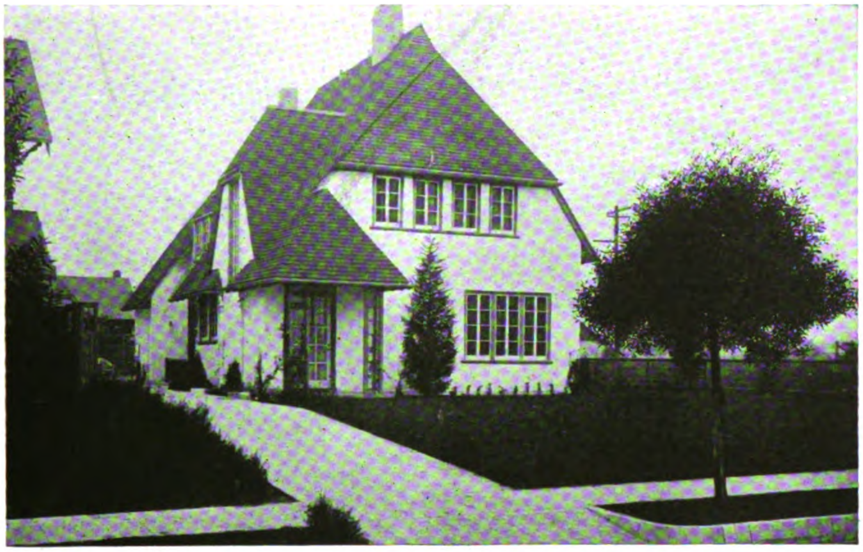
The Stucco House

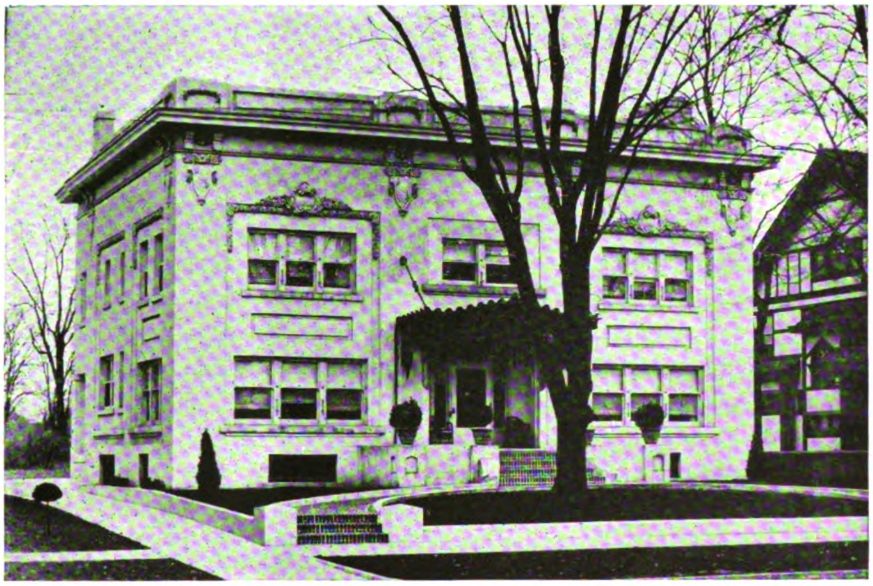
Throughout the residential districts of our cities, towns and villages will be found stucco houses of every imaginable design. On the farm will often be found houses and outbuildings of the same material.

Within the past few years stucco has been increasing in popularity, probably because greater stress is being laid on the need for proper construction of buildings of this type.

Many persons are skeptical of stucco houses—and with good cause. It is by no means uncommon to notice stucco construction that has spotted or cracked. Without doubt, there is no other material for housebuilding which can be so badly mishandled through







Attractive Exteriors in White Portland Cement Stucco

Courtesy of Sandusky Cement Co.

carelessness or dishonesty. However, where good materials are used, and used properly, there need be no fear as to the result, which will be both artistic and substantial.

Both structurally and architecturally, stucco possesses many advantages which render it an economical, artistic and dependable type of construction. It is not limited in its adaptation to any particular class of construction, but may be used with equal facility and economy either for the simple little bungalow or for the most elaborate and costly residence.

Because of the ease and facility with which it may be adapted to all grades of residences and small buildings, stucco affords the architect unlimited scope in developing almost any degree of architectural embellishment. Exterior columns, cornices, moldings and enrichments of any desired shape or arrangement may be readily formed in stucco with a degree of simplicity and economy possible with no other building material.

The comparatively thin exterior layer of cement plaster, light and easily molded, but at the same time strong and everlasting, gives the appearance of solid massive masonry and makes possible the execution of imposing architectural effects which could otherwise be obtained only at great expense.

Aside from its artistic possibilities and other architectural and structural advantages, stucco represents real economy. Being practically no more expensive to build than an ordinary frame clapboard house, the stucco house, if properly built, is a money saver in that it requires practically no maintenance. It does not fail perceptibly from year to year, but ages slowly and gracefully. Unlike the wooden building, which requires painting and other periodic repairs to keep it presentable and sound, the stucco house is durable and, being permanently self-colored, does not grow shabby, but is mellowed with age.

Stucco houses, in order to be durable, must be built with great care and must involve the use of the very best materials obtainable. The permanency of stucco construction is dependent, absolutely, upon the selection of proper materials and a strict adherence to certain essential principles of design and construction. Unless the supporting framework is rigid and well made, unless the materials entering into the construction are of the very best, unless these materials are prepared and applied with unusual care, stucco finish may be expected to crack, flake off, become spotted or deteriorate in one way or another in a comparatively short time. If, on the other hand, the construction is good, stucco may be depended upon as an economical, artistic and permanent form of construction, thoroughly

Courtesy of Bostwick Steel Lath Co.

Cow barns of stucco on metal lath

adapted to all grades of residences and other small buildings.*

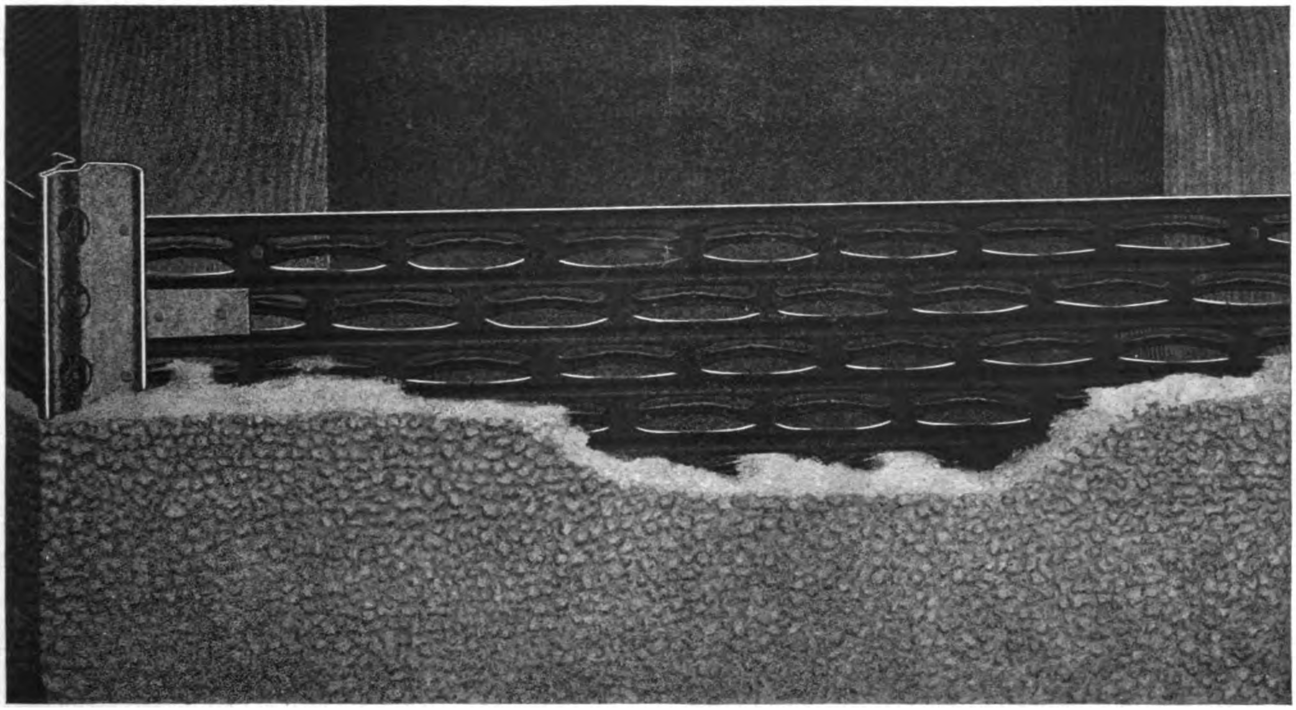
The Lath

Stucco is merely exterior plaster, and as such is consequently subjected to severe climatic conditions of heat, cold and moisture, which tend to disintegrate it and dislodge it from its support. For this reason, it is essential that the grade and quality of the lathing material be such that it will provide a secure and efficient foundation to receive the plaster and to hold it in place. The lath must, therefore, be a material which will establish a perfect key for the plaster. It must be thoroughly imbedded in the body of the plaster, in order that the reinforcing action of the metal may be perfect, and it must be a material which will not rust away under the action of the elements.

In stucco construction the lath is the foundation which supports the entire exterior covering of stucco, and the difference in cost between good lath and poor lath is so small that there is no excuse for jeopardizing the permanency of the structure by selecting any lathing material other than the best that the market affords. The greatest care in plastering, troweling and finishing cannot be expected to eliminate defects which are bound to result from an improper foundation, and for this reason the grade and quality of the lathing material are of vital importance to the success of stucco construction.

The exterior walls of one type of stucco house consist of a supporting framework of rigid timber construction, covered on the outside with metal lath and stucco, and on the inside with lath and plaster, preferably metal lath, as wood lath adds greatly to the fire danger. The framework should consist of wooden studding, which may be used either with or without sheathing. It is important that the timber framing be well braced, with all joints properly arranged in such a way that the building may be stiff and rigid as possible.

Better, though more expensive, is the stucco house, having walls of brick or hollow tile, with stucco exterior finish.



Courtesy of Bostwick Steel Lath Co.

Section of exterior wall showing application of metal lath with cement plaster

The Stucco

The exterior plaster or stucco is usually applied in three coats, which should finish not less than 1 inch thick. In constructing a stucco wall without sheathing, however, the exterior plaster face, including its coat of back plaster, should finish not less than 1½ inches, or, preferably, 2 inches thick. The total thickness of exterior plaster, however, should in no case be less than 1 inch, as it is impossible to make a thinner wall waterproof, and thorough water tightness is absolutely essential to the ultimate appearance of the stucco finish.

Care should always be exercised in selecting the sand for stucco, to make sure that it is entirely free from loam or organic matter, as a dirty sand will prevent the proper setting of the cement. Lime or plaster of Paris should never be used for exterior plastering, as it is not durable, and is apt to disintegrate under the action of the weather. A small amount of lime putty, however, may be used, together with the Portland cement.

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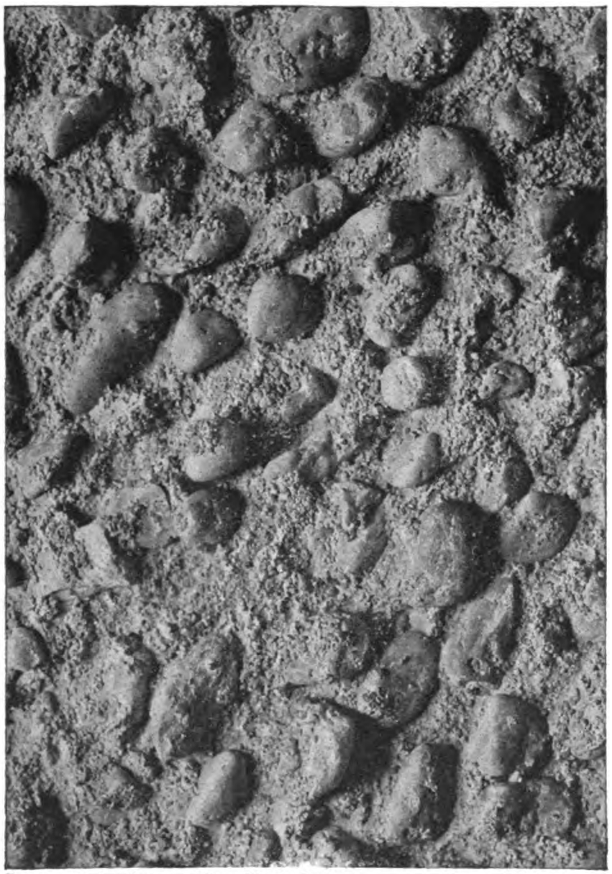
* Considerable information in regard to stucco was obtained through the courtesy of the Clinton Wire Cloth Company.

The first scratch coat is usually mixed in the proportions of 1 part Portland cement to 2½ parts of clean, coarse sand, with the addition of from 10 to 15 per cent of well-seasoned lime putty, to facilitate working. Hair binder is sometimes added to the scratch coat in the proportions of 2 pounds of hair to 1 barrel of cement.

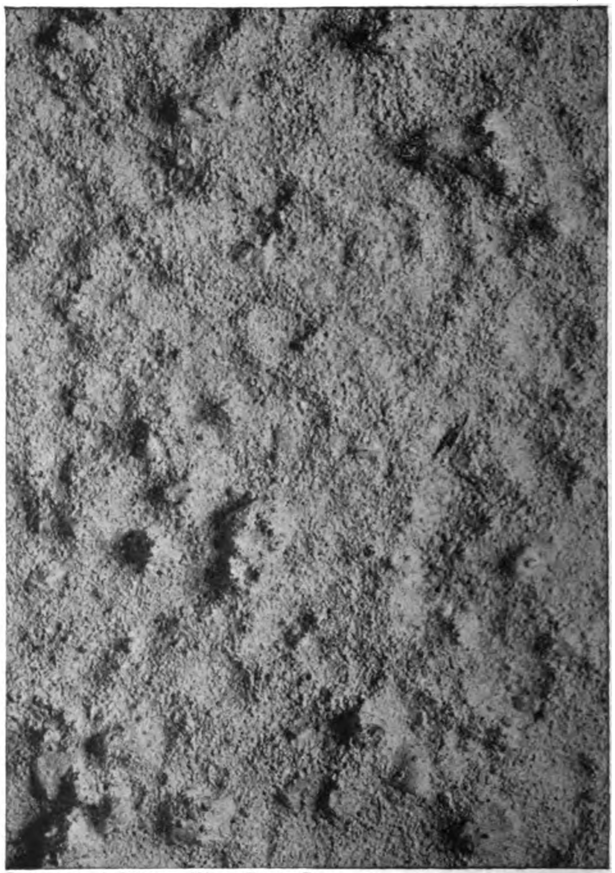
The second or brown coat is usually of the same mixture as the scratch coat, except that no hair binder is used in this coat. Before applying the brown coat the scratch coat should be thoroughly dampened.

The finish coat usually consists of Portland cement and sand mixed in the proportions of 1 part of cement to 2 or 3 parts of sand. Owing to the variety of surface finishes which may be obtained with stucco, the ingredients of the finish coat vary greatly, depending upon the exact nature of the finish desired. Hydraulic lime, marble dust, cracked silicate, pebbles, marble screenings, coloring matter and other materials are often used in order to produce various effects of texture and coloring.



Courtesy of Clinton Wire Cloth Co.

Pebble cast stucco surface



Courtesy of Clinton Wire Cloth Co.

Pebble dash stucco surface

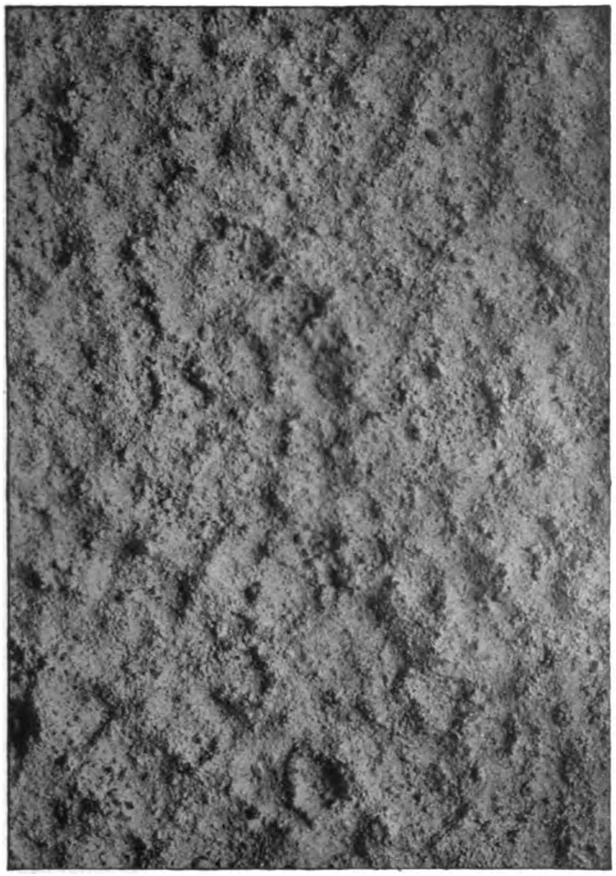
Surface Finish

Various degrees of roughness in the surface finish of the final coat may be developed, ranging from the smooth trowel finish to the rough cast, spatter dash or pebble dash finish. The rough surfaces, however, are always to be preferred, as they are not apt to show the fine checks or hair cracks, which are liable to occur in work of this kind.

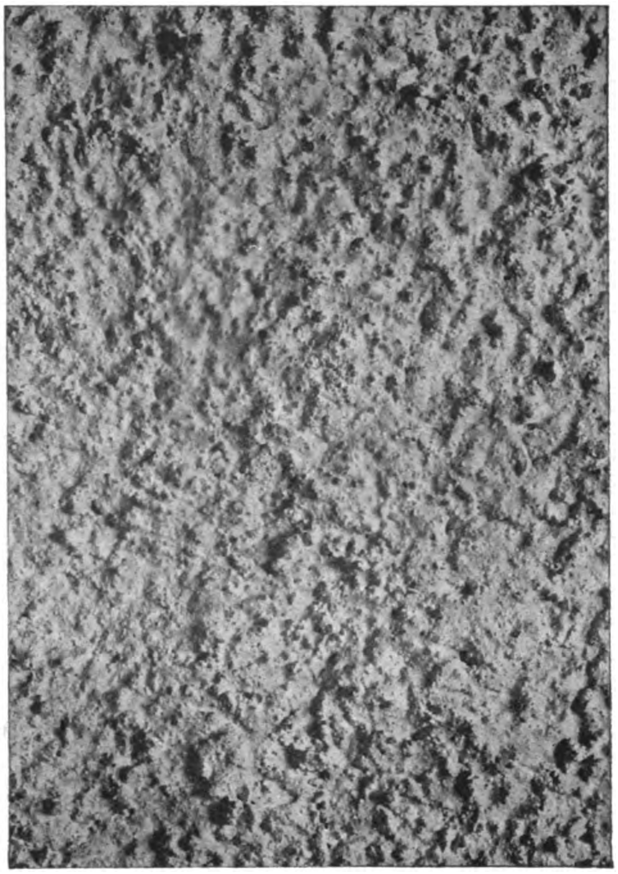
The smooth finish is obtained in the usual manner of floating to an even surface and troweleing to a smooth finish, while the rough cast or rough suction finish is obtained by floating and drawing the surface rough.

The rough cast finish may be obtained by using trowels covered with carpet or burlap. It is not well to trowel the surface too much, however, as the plaster is liable to crack and fall off if the cement is disturbed after it has begun to set. To obtain the best results, the rough cast surface should really be what is sometimes called sand finish. This is done by using a slight excess of sand and having the plaster not very wet. The sand should be large grained and coarse, as this will add to the rough appearance of the surface.

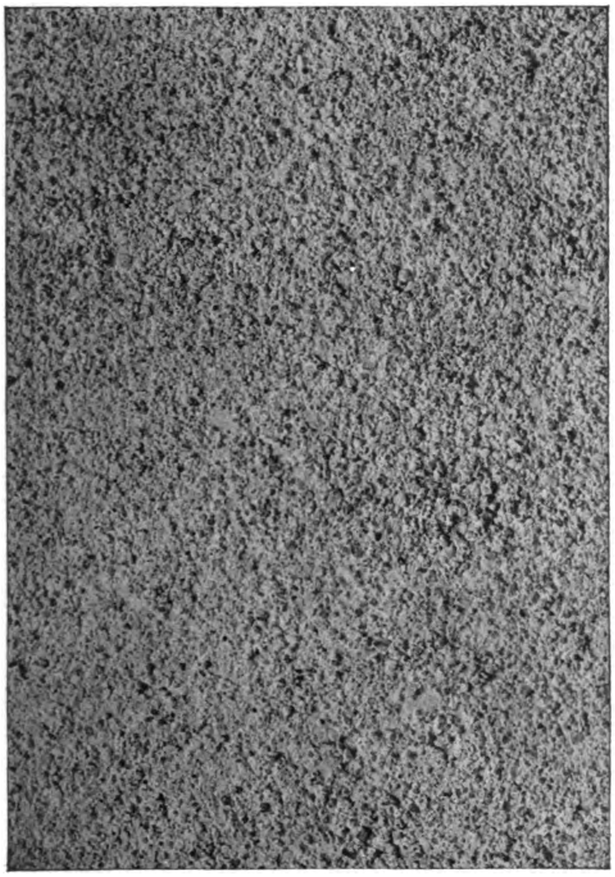
The slap dash or spatter dash, when performed by experienced workmen is probably the most satisfactory and is more universally used than any of the various finishes. The slap dash is secured by throwing a creamy mixture of cement and sand against the wall,



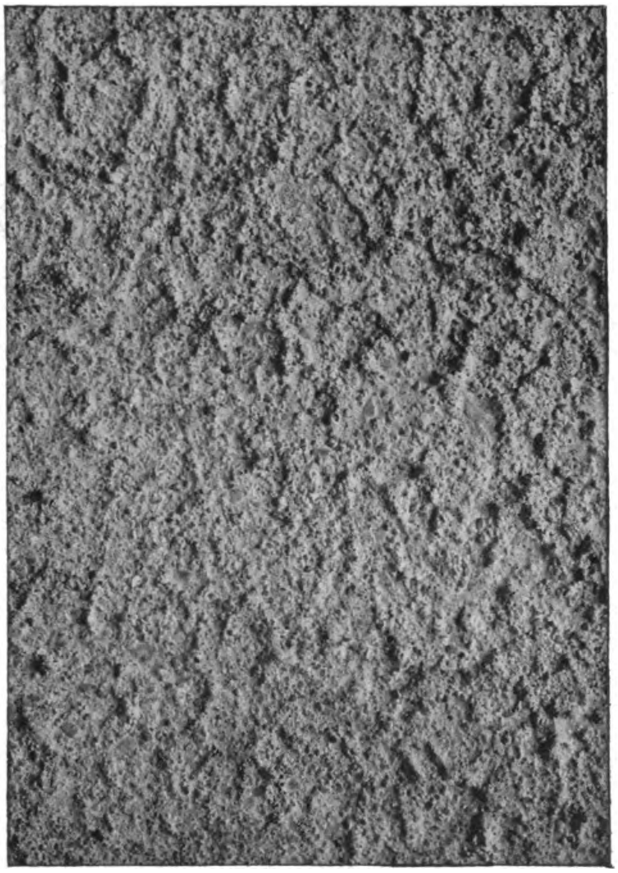
Slap dash



Stippled



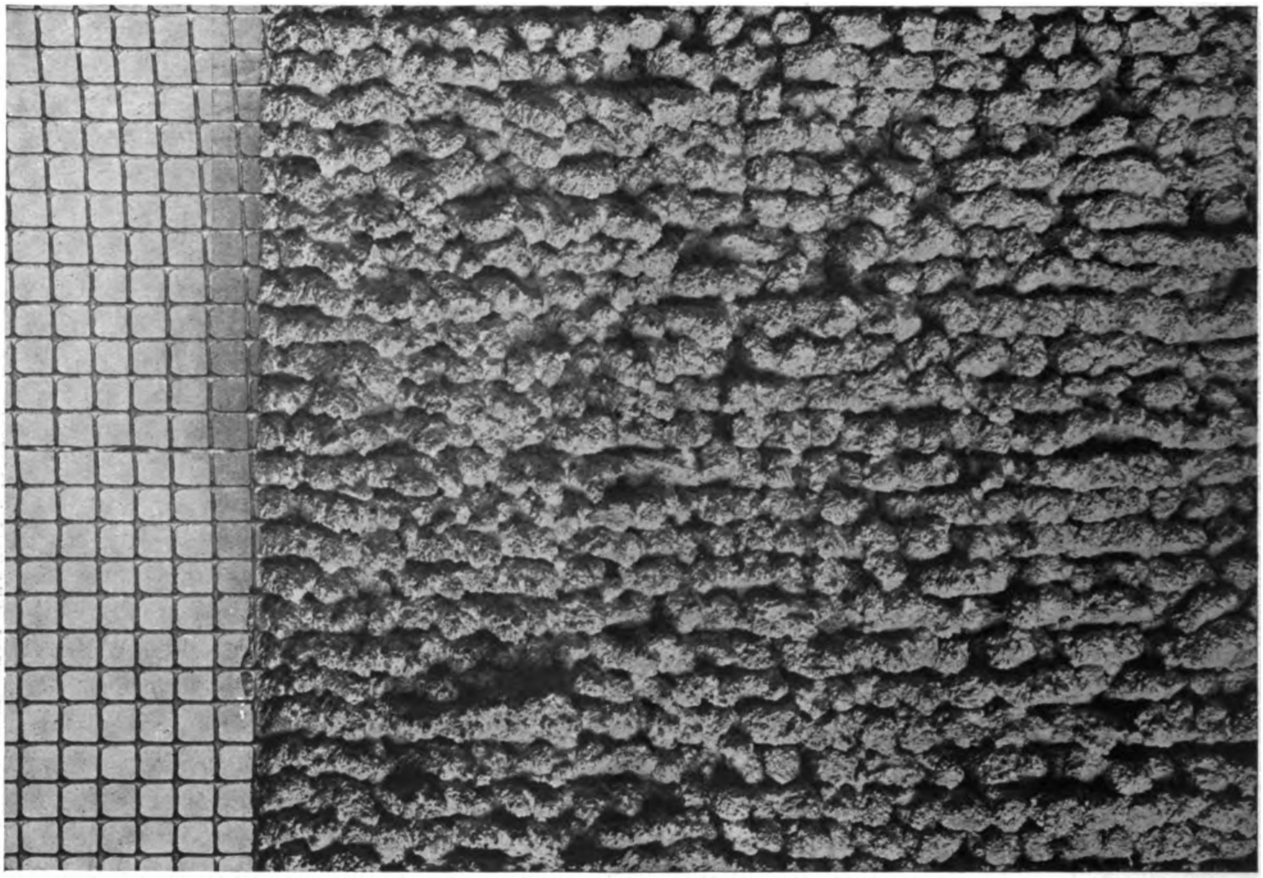
Sand float



Rough suction

VARIOUS TYPES OF STUCCO SURFACE FINISHES

Courtesy of Clinton Wire Cloth Co.



Courtesy of Clinton Wire Cloth Co.

Keyside of plaster on wire lath, showing excellent clinch

by dashing from a wooden paddle in such a way as to produce a roughened surface. A similar surface, although somewhat finer in texture, may be obtained by washing from a stiff broom.

The pebble dash surface can be secured by applying the final coat fairly wet and then throwing clean pebbles into the fresh plaster. The pebbles must, of course, be distributed uniformly over the surface, and must be thrown against the fresh, soft plaster with sufficient force to imbed themselves securely. Pebble dash finish is sometimes obtained by mixing small pebbles with a creamy mixture of cement and sand and applying like the slap dash.

Colored Stucco. (See Table on page 208)

The finish coat, when desired, may be colored by mixing in various coloring materials, which should always be carefully proportioned in exact amounts, and these amounts should not be changed or varied. Unless the builder is thoroughly familiar with dry coloring materials, and has had considerable experience in the use of them, it is usually advisable when colored work is desired to use some of the prepared color stuccos. There are a number of these on the market and some have proved very satisfactory.

Coloring is sometimes obtained by mixing screenings of colored marble in the finish coat. These marble screenings may be green, red, buff, black or white, and, by cutting or scrubbing the surface with acid after it has hardened, thereby exposing the colored screenings, some very pleasing color effects may be obtained.

Stucco Overcoating

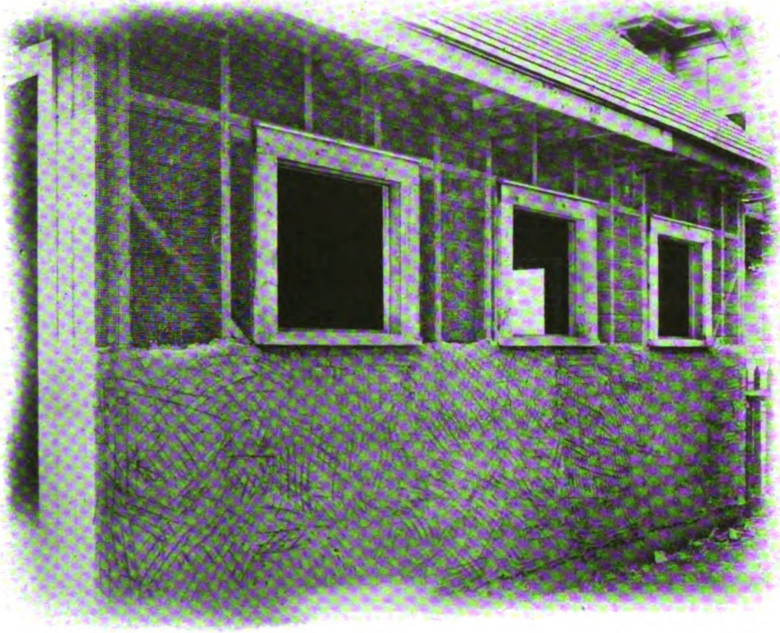
Within recent years a very interesting application of stucco has been rapidly developed in this country. This is the so-called "stucco overcoating," which should be of particular interest to the owners of old frame houses.

In this process metal lath and stucco is applied on the exterior of the old house, resulting in an attractive new exterior, which gives the solid impression of masonry, lessens the fire danger and the cost of maintenance, and prolongs the life of the structure for many years.

One of the most interesting examples of what such overcoating can produce in the way of satisfactory results was brought to the attention of the writer a few months ago. This was a three-story tenement house in a poor section of Brooklyn, N. Y.—one of a dilapidated row of old wooden three-deckers, having party walls and battered, discolored fronts of that hopelessly dingy brownish yellow so common to our wooden cities, and so offensive to the æsthetic taste.

The owner of this house, which was in the middle of the row, suddenly conceived the idea of overcoat-

A well-built house in the construction of which galvanized corrugated wire lath was used, and—

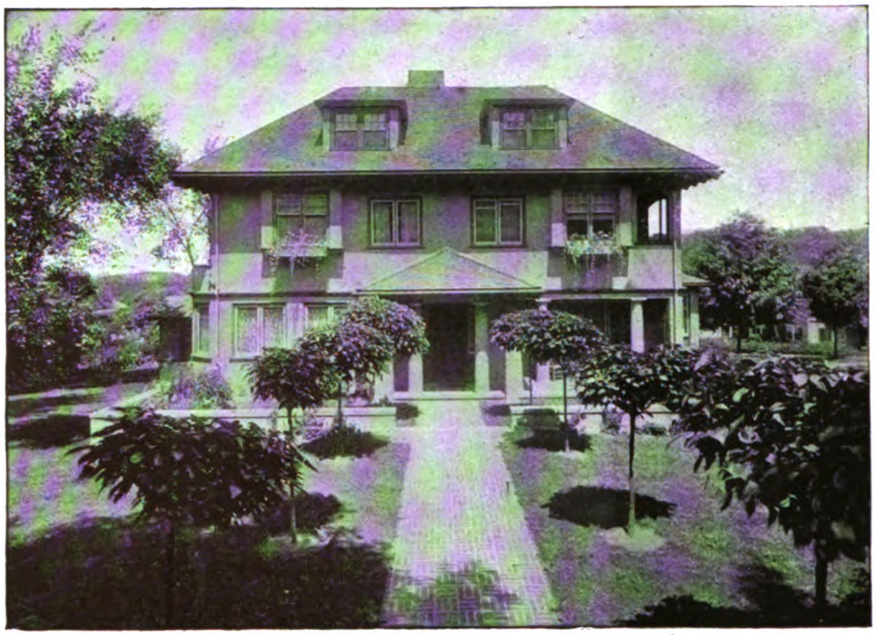


—this illustrates how such lath was used on the inside and outside of a garage.

Courtesy of Buffalo Wire Works Co.

ing the front. This was done, using metal lath and a tinted stucco, also using the same flexible material to bring out the simple architectural details. A belting course of ceramic tile which harmonized in color with the stucco was run across the face of the house just above the first story; two window boxes and a porch box of hardy flowering plants were placed in position. The tiny front yard, which had heretofore been of dirty brown earth and struggling weeds, was resodded and decorated with a cement entrance walk and flower urn. Finally the old tenants were asked to move and the house was redecorated throughout.

Imagine, now, how this house, with its appearance of attractive solid masonry construction, stood out from its unpleasant neighbors—no longer was it just one of Flannagan's Row. No! The new tenants were of a better class than those who went out, and paid more rent—and regularly! And with them came the pride of place—theirs was the "new" house—their children must be a little cleaner than the neighbors'!



Courtesy of the Clinton Wire Cloth Co.

These attractive homes, in the construction of which wire lath and cement plaster were used for exterior walls—

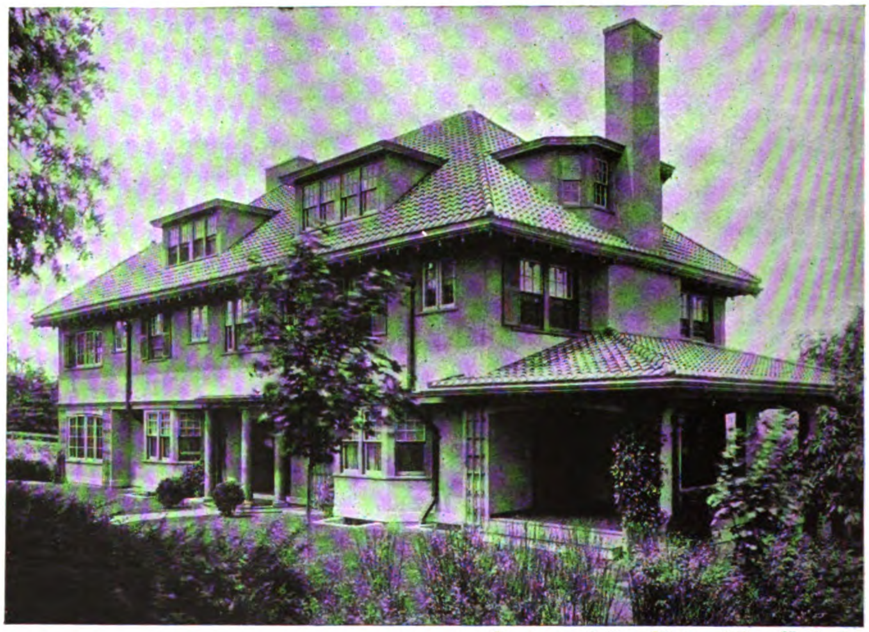
Financially this simple improvement was a decided success. Although real estate values were at their lowest ebb, the mortgage was renewed without a question, while the neighbors faced foreclosure. The rental income made the property really worth owning and steady tenants were assured. All this for a total cost of a very few hundred dollars!

Reinforced Concrete Homebuilding

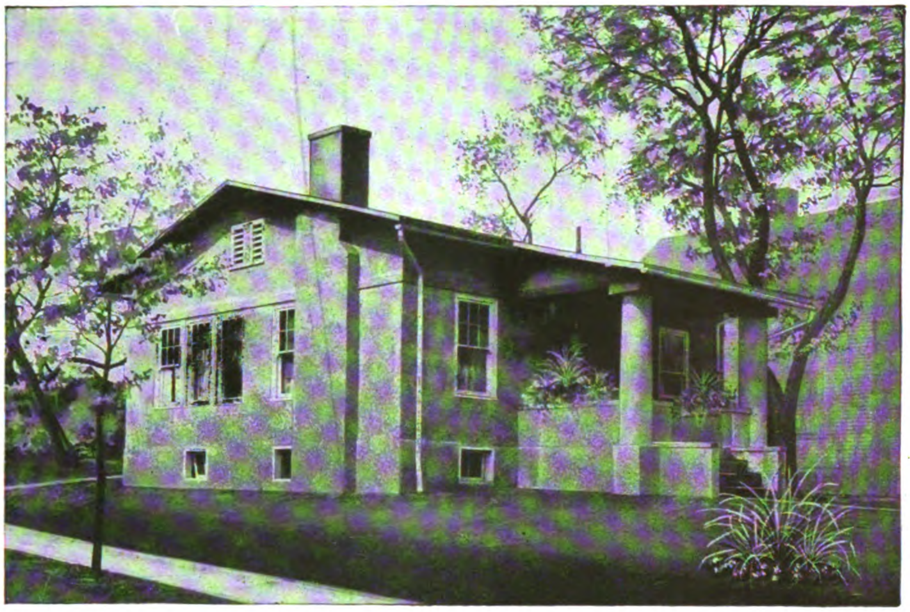
Among the many applications of reinforced concrete in building construction, its use in firesafe home building has been, perhaps, as general as any. Of course, concrete construction, as well as the use of stucco, has in many cases been badly abused, either through ignorance of proper practice or the short-sighted policy of unscrupulous builders.

To obtain proper results it is but natural that any cement mixture must be properly and honestly proportioned and applied, and the design must be a combination of commonsense and knowledge of the pro-

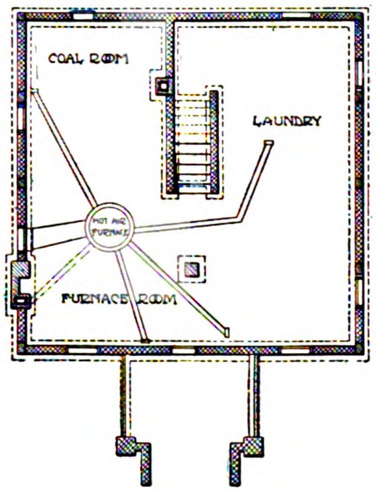
—show the flexibility and artistic possibilities provided by the use of these materials



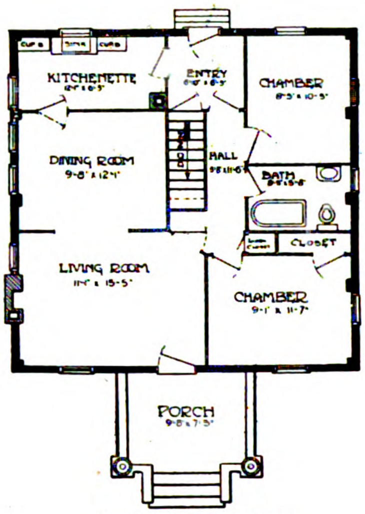
Courtesy of the Clinton Wire Cloth Co.



The fireproof bungalow—steel and cement construction entirely



BASEMENT PLAN



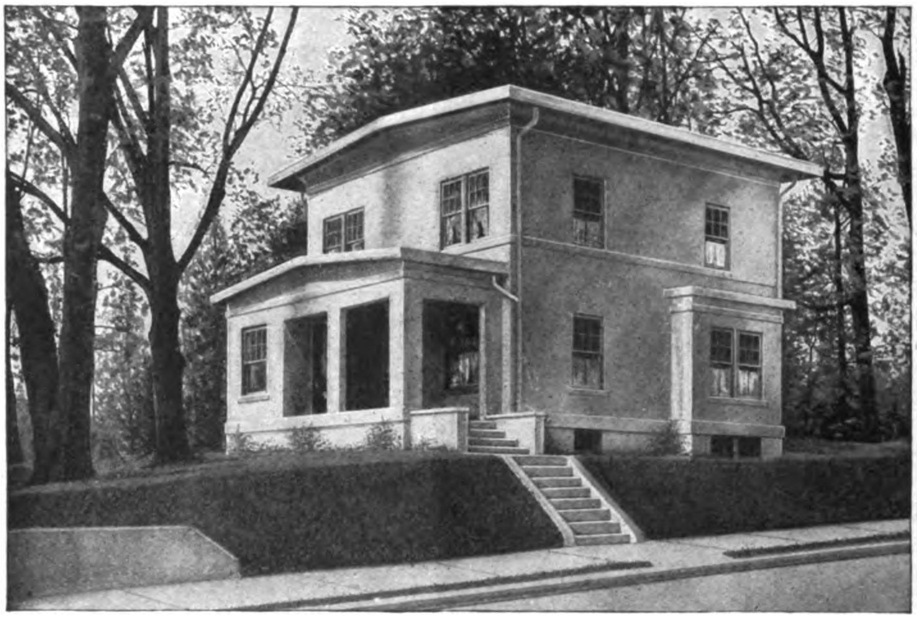
FIRST FLOOR PLAN

Courtesy of General Fireproofing Co.

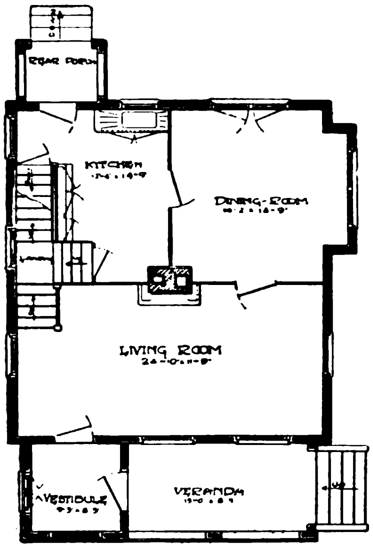
erties of concrete and reinforcing.

If, in this type of construction certain qualities of aggregate and quantities of cement are called for by standard practice, it constitutes the most absurd of follies to attempt to substitute inferior material or insufficient quanties in a mistaken effort to economize. So, too, the idea of attempting to pour concrete or to handle the mix in weather which is dangerously near the freezing point may, instead of saving time and "rushing the job," result in unstable and unsafe construction.

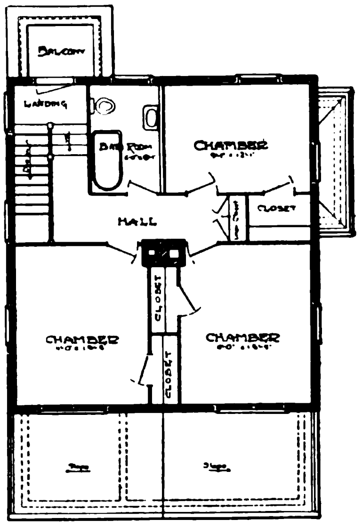
Owing to the faults of poor construction there have been instances when concrete has proven very unsatisfactory for home building. The result of such occurrences has been the instilling into the minds of some prospective builders a certain antipathy toward the use of concrete. By some it is claimed that reinforced concrete walls will admit moisture. Others have heard of unfortunate experiences in the use of cement blocks and of various patented types of concrete construction. Such instances are invariably the result of improper practice, either on the part of the builder or of the manufacturer of special types of concrete construction. Prospective builders who contemplate the use of concrete will do well to insist on proper specifications for reinforced concrete construction and strict adherence thereto on the part of the builder. If special forms of blocks or patented construction are to be used, great care must be exercised to select only the products of reputable manufacturers



The fireproof house—built throughout of steel and cement



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Courtesy of General Fireproofing Co.

who have definite accomplishments to show in proof of the soundness of their product or method.

Reinforced concrete, as will be explained in later paragraphs, can be made absolutely damp proof by proper mixture; there are on the market several types of cement blocks which are dependable and economical; and of the patented types of hollow concrete wall construction several are to be recommended. Therefore, it is plain to be seen that the use of concrete for home building may be absolutely dependable where proper precaution and selection are exercised. Failure in concrete construction may always be ascribed to the designer or builder rather than to the material employed.

The House Unburnable

A topic of practical interest in connection with the subject of concrete house construction is that of an unburnable and indestructible house, built entirely of cement and steel at Youngstown, Ohio. This house, built recently,* and a bungalow of similar construc-

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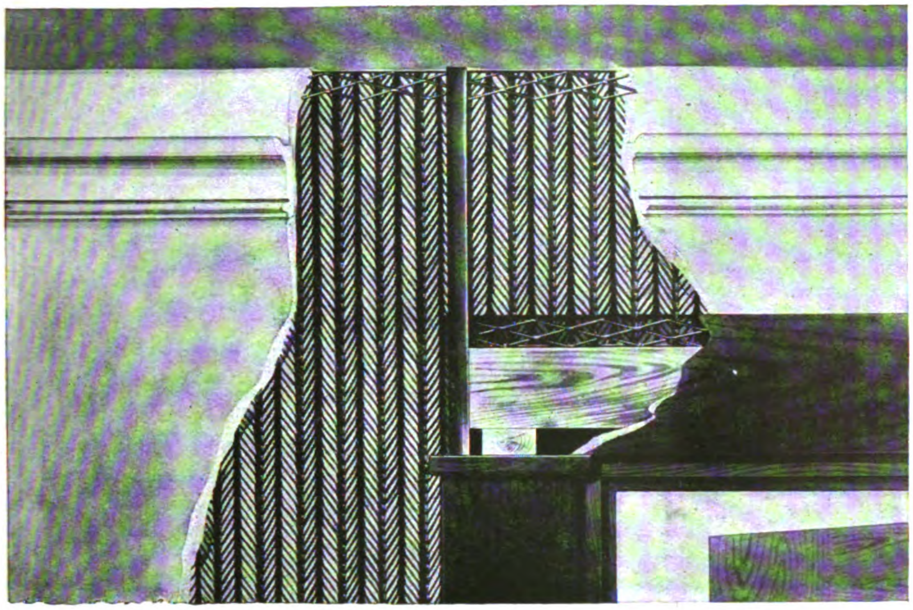
* Built for demonstration by the General Fireproofing Company. All illustrations of this construction shown by their courtesy.



Solid partition construction details. Metal lath fastened to ceiling and above door by expanded metal angle. Door frames held in place by channels at both sides

Courtesy of General Fireproofing Co.

tion, are pictured in the pages of this article, together with details of the construction. Following is a brief description of the construction:

Basement—9-inch solid concrete on concrete footings. Grade line to first floor line—8-inch brick wall. Floor—4 inches concrete, 4 inches of cinder, 1 inch cement. Outside wall, floor surface, mortar joints in and outside plaster over brick work all waterproofed.

Frame—Structural steel, columns supporting floors and roof set in foundation.

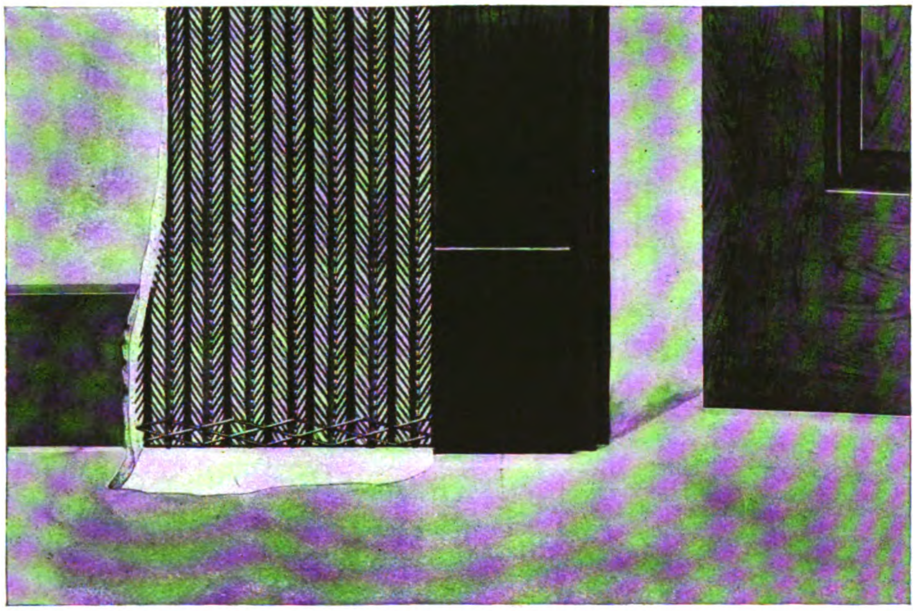
Roof—2½ inches of concrete, reinforced with patented expanded metal reinforcing, plastered on the under side with ½-inch of cement mortar and waterproofed.

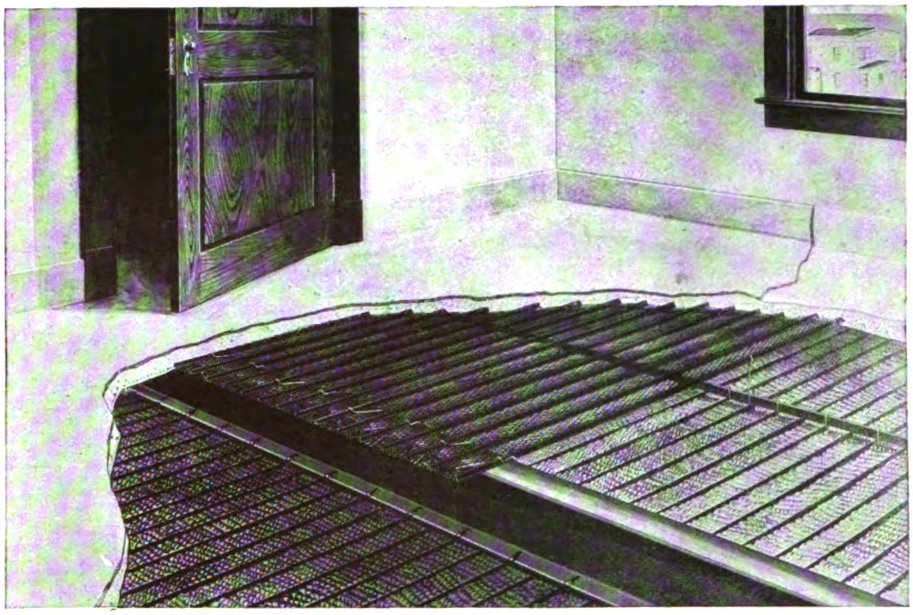
Side Walls—2-inch cement slab made by wiring to the steel frame a patented reinforcing consisting of corrugated expanded steel sheets plastered on both sides with cement plaster, waterproofed and finished in any of the stucco finishes described in this article, a 4-inch air space and ¾-inch inside wall of metal and cement plaster.

Floors—2½ inches of concrete placed on top of patented metal reinforcing, which is laid over I-beams and fastened thereto. Over the concrete is placed a non-combustible sanitary composition flooring, which is carried up over the sides of the walls to form baseboards.

Ceilings—Of patented metal reinforcing and cement plaster. Metal lath in first story ceiling is fastened

Solid partition construction details. Metal lath fastened to door by expanded metal angle. No studding required





Detail of concrete floor, showing 2½ inches of concrete and ½-inch composition flooring on top of concrete. Note clips fastening metal lath to I-beams. Cement plastered ceiling over metal lath is also shown. Hangers for intermediate ceiling support are embedded in the concrete—

Courtesy of General Fireproofing Co.

by clips directly to the under side of the beams and plastered 5/8 inch thick. In second story ceiling metal lath is suspended from the roof by hangers and channels.

Partitions—2-inch solid cement, with patent metal lath reinforcing.

Stairway—An important detail when considering the fireproofing of any structure is the stairway. In case of fire, stairways are flues for the fire to travel upward and often losses are much more serious because these vertical openings furnish the necessary draft for flames.

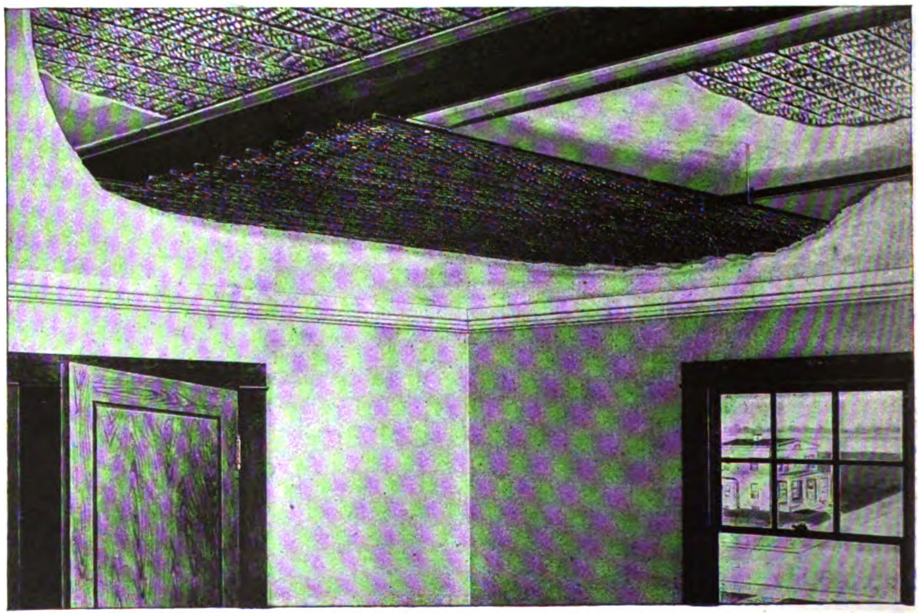
The stairway in this firesafe house is of concrete and steel. There is nothing to burn—nothing that permits fire to spread.

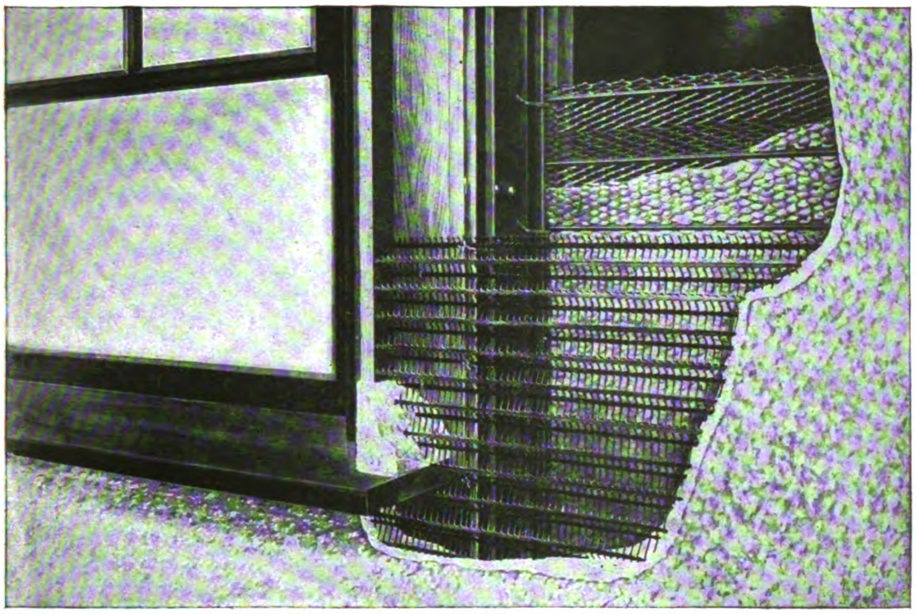
Suspended from I-beams at top and bottom of the stairway is special reinforcing, over the top of which is placed a sheet of expanded metal to give extra reinforcing. On top of this wooden forms were placed for the risers and the concrete for the entire stairway poured at one time. The metal lath was then back plastered.

The newel posts and railings are constructed of channels and metal lath. Posts are poured solid inside a metal lath form and plastered outside. Panels between posts are built with lath and channels plastered solid on both sides with rounded top rail.

Interior Trim—The small amount of trim required is of wood and is fastened by screws. Any style of trim, whether wood or metal, can be used in build-

—ceiling and under side of floor. Metal lath fastened by special clips to the top of I-beams, forms the basis for the 2½-inch concrete floor. The under side is back plastered with cement mortar. Metal lath attached to under side of beams and intermediate supports, forms the basis for cement plaster ceiling





Details of wall construction around window frames showing exterior slab, air space and interior slab. Note channels which hold window frames in place

ings of this type. Details of this nature can be adopted to the taste of the builder without affecting very much, one way or another, the fireproof qualities of the structure.

Plumbing and Wiring—This is arranged for as easily as with old-time wooden houses. Conduits and water pipes are placed before concrete and cement are applied. There they are permanent and out of sight.

The novel arrangement of the heating system is very similar. The heating ducts for the second floor are carried up alongside the chimney and enclosed within a framework of metal lath and plaster.

An Economical Method of Constructing Concrete Walls

There are many ways of building the walls of a concrete house and each has its advantages. Some builders prefer the hollow wall construction, while others have adopted the solid concrete wall reinforced with horizontal and vertical steel rods.

The blue prints on page 222 illustrate a type of wall construction that is to be highly commended for its simplicity, efficiency and economy. This method of wall construction was employed in the building of the houses shown on page 207.

Building the Frame

In Fig. 1, the reinforced concrete girder (a) sur-

Detail of roof showing construction of enclosed gutter. Note cement plastered metal lath ceiling suspended from roof by hangers

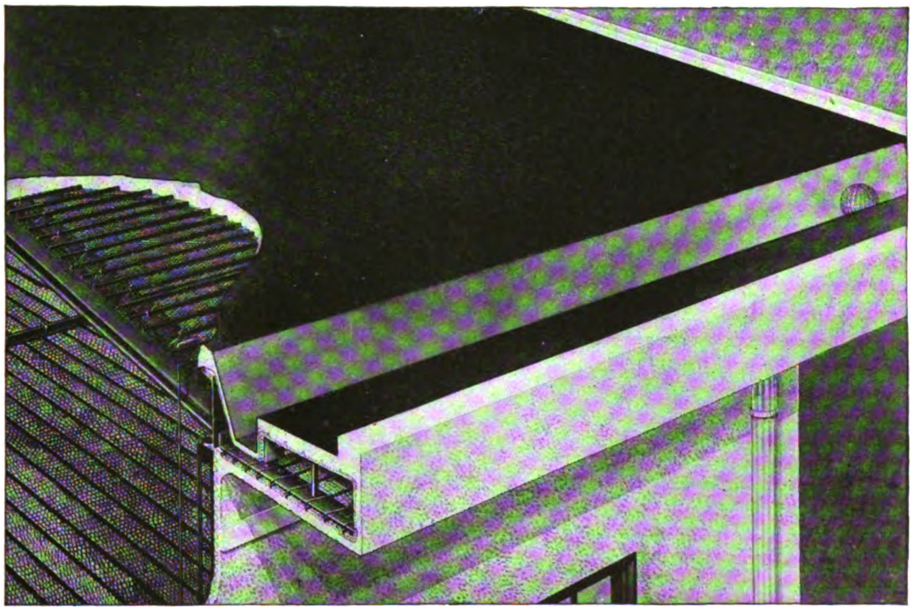


FIG-1

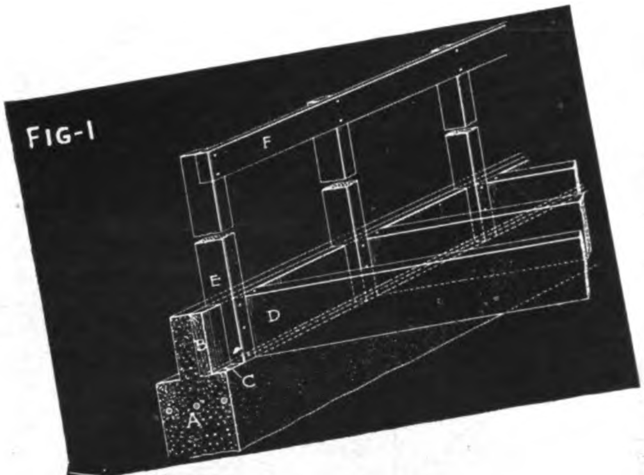


FIG-2

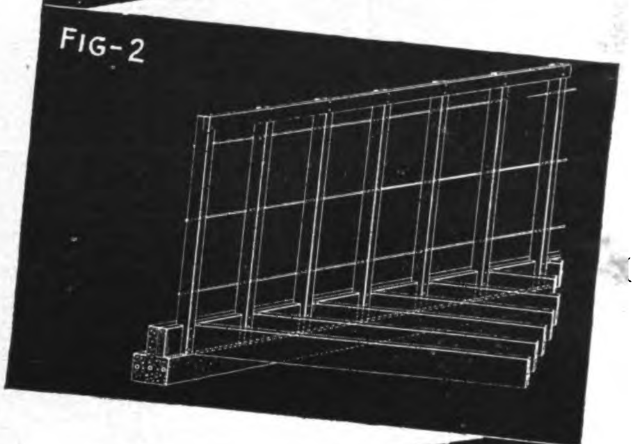


FIG-3

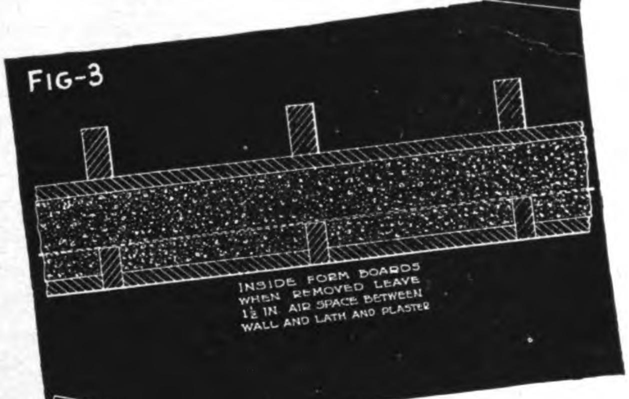
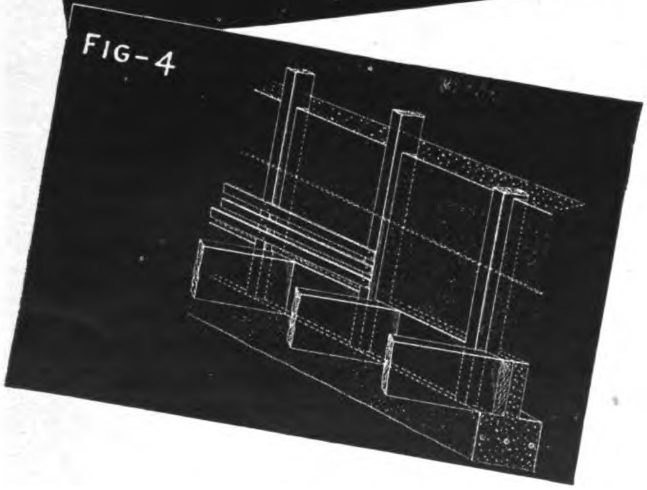


FIG-4



Courtesy of Alpha Portland Cement Co.

mounts the foundation wall. A 2 x 10 sill (b) is placed on edge against the inside of the projection at the top of the girder and rests on the shelf (c). The joist (d) rests on the shelf (c) and is spiked to the sill (b). The 2 x 4 stud (e) is halved 10 inches and spiked to the sill (b). The stud is also halved at the top and the 2 x 4 plate (f) set on edge flush with the inside of the stud.

Reinforcing.

When the frame for the house has been completed three ¼-inch wires equal distances apart are run horizontally around the outside of the studding (See Fig. 2). These wires are fastened to the studs with 2-inch staples.

Forms

Fig. 3 shows the forms ready to receive the concrete. 1½-inch material is used for the inside forms, and it is placed between the studding flush with the inside of the studs. While this material is cut in such a way that the lumber cannot likely be used for other purposes, if a number of walls are built on the plan here indicated, the forms can be used repeatedly. The outside form is held in position by wires passed around 2 x 4 or 3 x 4 form uprights and tied to the studding.

Air Space

After the concrete has been poured and allowed to set, the forms are removed. When the inside forms are taken out a 1½-inch air space is left between the inside of the concrete wall and the lath and plaster. See Fig. 4. The studs are firmly imbedded in the concrete and the wire reinforcement is near the center of the wall.

The question has been asked, "Will not the wood stud crack the concrete when it swells?" When it is borne in mind that the stud will be subjected to a greater amount of moisture when the concrete is poured than at any other time, it will be seen that no trouble will result from the swelling of the wood.

Reinforced Concrete Questions

In connection with the subject of reinforced concrete home building, there are many questions which may come up from time to time. One of the most important of these is, whether or not reinforced concrete walls will admit moisture; and, if so, how they can be dampproofed?

Watertight construction in this case consists merely of properly proportioned mixtures placed at correct consistency, followed by such protection to the finished work during the first few days as to prevent too rapid drying out of the concrete. To be more explicit, watertightness in concrete depends entirely upon eliminating voids or air spaces. or coming so near to complete elimination that the remaining voids are unappreciable. By far too much concrete is placed by using a mixture too

Courtesy of Alpha Portland Cement Co.

Monolithic concrete construction

dry or too wet. It is very important that correct consistency be used, and this may be identified by saying that the mixture should be of a quaky or jelly-like consistency—one that will stand fairly well in a pile, but, on being slightly puddled or agitated, will immediately start to change its shape or form. Such a mixture cannot be tamped, but must be spaded or puddled while placing. This operation will cause the concrete to settle to all parts of the form. It is important also that spading be thorough against form faces so as to force back coarse particles of aggregate from the forms and thus allow a film of sand-cement mortar to come to the face. After the work has been finished the concrete must be protected against hot sun and drying winds for several days, so that it will not lose moisture and thus rob the concrete of the water necessary to complete hydration of the cement.

The thickness of concrete walls for a two-story house would ordinarily be 12 inches for the lower floor and 8 inches for the second floor. These thicknesses, however, may be reduced under certain conditions, depending on the size of the house, loads which must be carried, and other considerations which would naturally enter into the widely varying possibilities of concrete design.

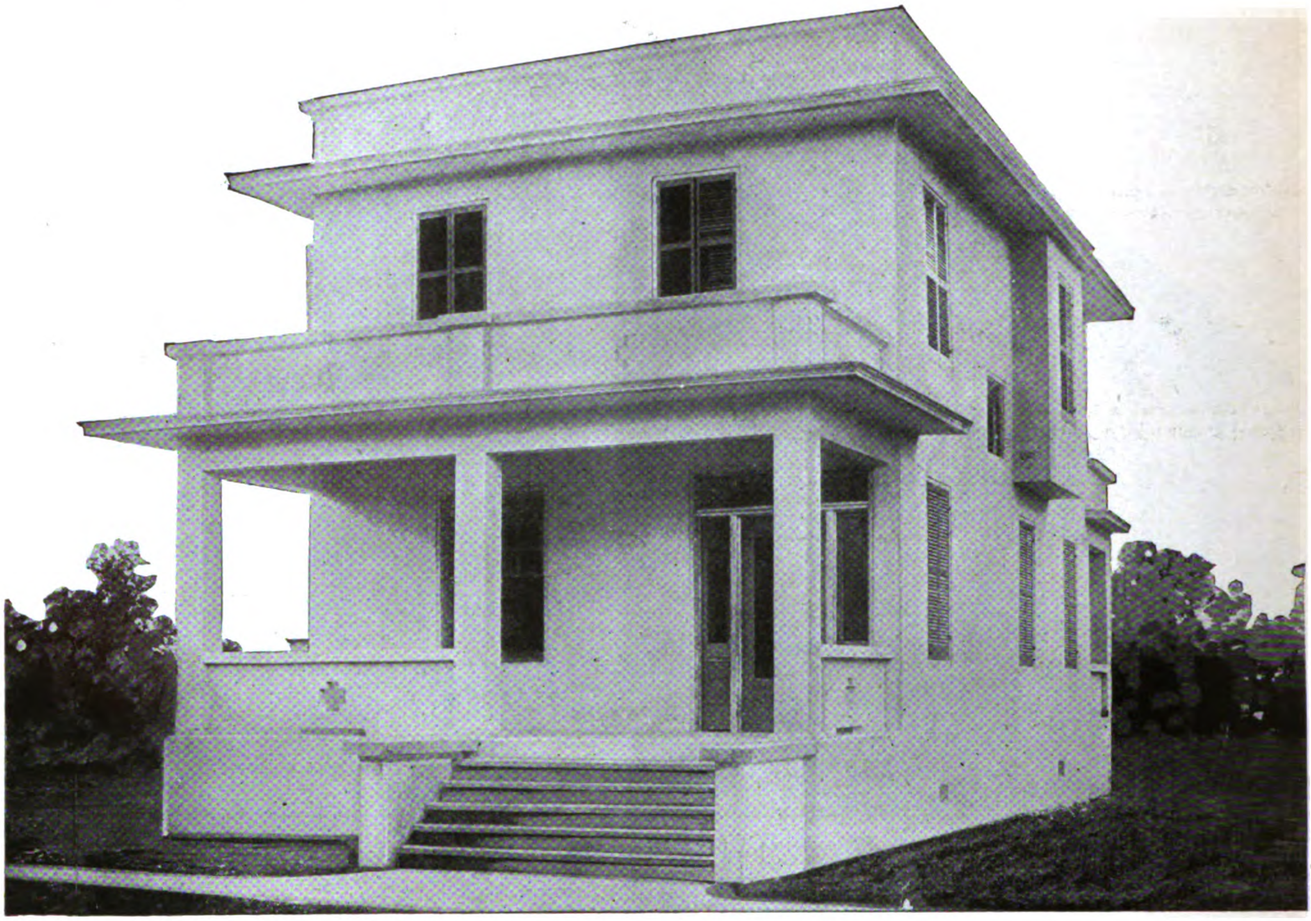
The matter of reinforcing has been greatly simplified by the introduction of various patented forms of metal and wire lath. The ordinary types of reinforcing are round or square rods, mesh, expanded metal or woven wire.

Within recent years a great deal of attention has been given to the subject of providing air space in concrete walls, such space having insulating value. Several patented form systems are on the market and involve methods of laying double monolithic walls separated by air spaces. In addition to this, various types of concrete blocks exist; one of which consists of a unit for the outer wall face and one for the inner wall face, tied together with iron bolts when cast. Most of these blocks contain air cells only, and so do not provide a continuous air space.

One of the simplest methods of providing air space in the concrete wall is that of furring out a sufficient distance from the inside wall surface, so that when the interior plastering has been applied to the lath (preferably metal) attached to these furring strips there will be an air space between the plaster coat and the inside wall surface.

Concrete Floors in the House

There are many types of concrete floor construction available for use in building floors in the home. These vary from the plain slab and ribbed slab to that of light metal joists with metal lath on top for thin-plastered floor slab, and similar application of lath to the bottom of metal joists to provide for thin-plastered ceiling.



Courtesy of Alpha Portland Cement Co. **A practical design in monolithic concrete**

The following specifications will be of value to those who are considering the use of reinforced concrete floors of the ordinary type. These specifications may be considered standard and represent the best practice in safe construction.

Suggested Specifications for Reinforced Concrete Floors

These specifications apply to concrete floors subjected to considerable wear, and cover the construction of the concrete slab and the laying, finishing and curing of the wearing course either at the time the concrete slab is placed or after the concrete slab has hardened.

I.—Materials

1. CEMENT—The cement shall meet the requirements of the standard specifications for Portland cement adopted by the American Society for Testing Materials, August 16, 1909, with all subsequent amendments and additions thereto adopted by said society.

2. AGGREGATES—Before delivery on the job the contractor shall submit to the architect or engineer a fifty (50) pound sample of each kind of aggregate proposed for use. These samples shall be tested and if found to pass the requirements of the specifications similar material shall be considered as acceptable for the work. Additional tests shall be made at any time during progress of the work if desired by the architect or engineer. All aggregates used shall meet with the approval of the architect or engineer, and shall fulfill the requirements of these specifications. In no case shall aggregates containing frost or lumps of frozen material be used.

Fine Aggregate. Fine aggregate shall consist of natural sand or screenings from hard, tough, durable crushed rock or gravel, consisting of quartzitic grains or other equally hard material graded from fine to coarse, with the coarse particles predominating. Fine aggregate, when dry, shall pass a screen having four (4) meshes per linear inch; not more than twenty-five (25) per cent shall pass a sieve having fifty (50) meshes per linear inch, and not more than five (5) per cent shall pass a sieve having one hundred (100) meshes per linear inch. Fine aggregate shall not contain vegetable or other deleterious matter nor more than three (3) per cent of clay or loam.

Fine aggregate shall be of such quality that mortar composed of one (1) part Portland cement and three (3) parts fine aggregate, by weight, when made into

(*Continued on page* 245.)

Building Zone Plan Adopted by New York City*

By Robert H. Whitten,
Secretary, Commission on Building Districts and Restrictions

ON July 25, 1916, the Board of Estimate and Apportionment of the city of New York put into effect a building zone plan. This is the most comprehensive and far-reaching plan for the control of the building of the city that has ever been adopted by any American city. All admit the desirability of order in building development. All have witnessed the irreparable injury caused by haphazard building. That a public garage, stable or factory should be permitted to invade and destroy one after another the best residential blocks of the city seems wasteful and foolish. Yet so implicit is our adherence to the theory that a man must be allowed to do what he please with his own property that we have considered ourselves powerless. Up to a few years ago this was the prevalent attitude in New York city. This supposed legal difficulty was fortified by the practical difficulty of securing an agreement in a democratic community on the details of a plan to control and direct city building. Yet, notwithstanding these supposed difficulties, legal and practical, New York city has adopted a building zone plan with a substantial unanimity of opinion.

Welcomed by Property-Owners

What a few years ago would have been ridiculed as fantastic, arbitrary and confiscatory is now welcomed by the property-owners themselves as reasonable and absolutely necessary in the interest of the public health, safety and general welfare, and for the conservation of property values. The property-owners of New York city have in recent years had some peculiarly distressing experiences with haphazard construction. This fact, taken in connection with the quiet, patient work of the Commission on Building Districts and Restrictions, has brought about with very little opposition the adoption of a comprehensive plan for the control of future building development throughout the five boroughs of New York city.

In working out the plan the commission made a block-to-block and lot-to-lot study of the entire city. Existing conditions were accepted as found, and with existing conditions as a starting point the commission, in conference with the property-owners affected, experienced little difficulty in determining street by street and block by block the character of the restrictions to be imposed. The chief source of difference was an insistence by property-owners on the imposition of more severe restrictions than the commission deemed wise. There were a great many more objectors who wanted more restrictions than those proposed, than objectors who wished to have the proposed restrictions removed. On final passage, out of sixteen votes in the Board of Estimate, only one was recorded against the adoption of the plan, and apparently the only reason for this one vote in opposition was that the committee of the whole of the board refused a request to incorporate certain more restrictive regulations in the plan presented for adoption.

Simple in Principle

The plan adopted, while necessarily detailed and complicated, is in principle the most simple and obvious thing imaginable. Residence districts are established and they are protected against invasion by trade and industry of every kind. Business districts are established and they are protected against invasion by the trades and industries that are admittedly a nuisance in a retail business section. Unrestricted districts are established where any kind of industrial business or residential use is permitted. The unrestricted districts are chiefly located along the railway terminals and the navigable waterfront. They comprise the sections now devoted to industrial uses and those in which an industrial use seems appropriate. The business districts, except in the main centers, are for the most part made up of the frontage on both sides of the traffic thoroughfares. The local retail business naturally follows the traffic thoroughfares and transit lines. By preventing the sporadic store from locating in the side residential streets, values on both natural business arteries and the side residential streets are improved. The concentration of all local stores on the main arteries helps values on such streets and the exclusion of the store from the residential streets improves rentals on such streets.

Safeguarding Residence District

In a residence district all kinds of business and industry are excluded. Dwellings, private clubs and most institutional buildings are permitted. The term "dwelling" includes an apartment house, tenement house, boarding house, or a hotel having thirty or more sleeping rooms. The usual accessory buildings, such as private garages, are permitted, but they must be located on the same plot with the building to which they serve as accessory. A private garage for more than five motor vehicles would, however, be excluded. A private club that has as its chief activity a service customarily carried on as a business, such as a garage, would be excluded. While the regulations are not intended to interfere with a doctor or dentist who practices his profession in the usual inconspicuous way in his private dwelling, they would exclude any business such as a store in connection with a tenement, club or hotel. It is provided, however, that the superintendent of buildings may, after notice and hearing and with appropriate conditions and safeguards, permit in a residence district any building or use in keeping with its use for residence purposes.

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* Paper read before the League of American Municipalities, Newark, N. J., September 8, 1916.

In a business district, residence and business uses are permitted, but industrial uses are either prohibited entirely or limited in the percentage of floor space they may occupy. A list of specified industries and uses of a clearly objectionable character are entirely excluded, as are also all other uses that are noxious or offensive by reason of the emission of noise, odor, dust, smoke or gas. No building may be used for factory purposes in excess of twenty-five per cent of the total floor space of the building but a space at least equal to the ground area of the building or lot may be so used. The term "factory" is defined as a building or portion of a building in which six or more persons are employed in any process or part of a process of transforming or converting raw material, partly wrought material or imperfect material into forms suitable for use. This limited provision for factory use in a business district is appropriate both on account of the considerable percentage of factory use required in connection with the retail trades and on account of the numerous customary small trades and factory uses that are necessary or desirable for the convenience of the neighborhood and, if limited in size, are not objectionable from the point of view either of the business use of the street or of the residential use of the adjacent areas.

Stables and Garages Barred

A garage for five or more motor vehicles will be excluded from a business district except that with the approval of the building superintendent and after notice and hearing, a garage may be erected in a business district on any portion of a street between two intersecting streets on which there exists a public garage at the time of the passage of the proposed resolution. A similar regulation is provided in regard to stables. In the tentative report it was proposed to permit public garages and stables in any business district, but the nuisance features incident to the indiscriminate location of garages throughout the business districts were so great that the commission reconsidered its former action. In providing that garages shall in general be forced to go to the unrestricted districts, the commission has increased the number of small unrestricted sections within convenient access of the local residence and business centers.

In general, the salt marshes along and running back from the waterfront have been included in the unrestricted district. Industry very naturally pre-empts such localities both on account of the comparative cost of the land and the possibility of good water and rail terminal facilities. In addition, all other navigable waterfront, where the grades and location are favorable to a commercial or industrial development, is left unrestricted. The unrestricted area is allowed to extend back from the bulkhead line 1,000 feet or more, depending largely on the slope of the land. In many cases the boundary line of the waterfront unrestricted district follows quite closely the 20-foot contour line. This seems to be about the normal level to which industry will extend back from the water.

Little Change in Industrial Belts

An examination of the historical maps prepared by the Commission showing industrial development at various periods during the past sixty years in Manhattan and Brooklyn shows surprisingly little change in the breadth of the industrial belts extending back from the waterfronts. There has doubtless been a great deal of change in the character of the industries located in a particular section. The tendency has been for the heavier, bulkier types of industries requiring large plots to move from Manhattan. They have been replaced by a much larger number of industries requiring less ground area per industry without greatly changing the aggregate requirement for ground area.

The segregation of factories will directly reduce production costs. It will make it possible to have the best rail and water terminal facilities and the best express and mail facilities. It will reduce trucking and thus improve street traffic conditions. It will tend to the segregation of heavy traffic trucking from other classes of street traffic and thus further tend toward the improvement of street traffic conditions.

Furthermore, the segregation of factories along the rail and water terminals and their consequent exclusion from the residence sections will improve living conditions throughout the city. A factory is usually a nuisance in a residence section. It is often directly injurious by reason of noise, odor, dust or smoke. It always brings heavy trucking with attendant noise and danger to the safety of the children, especially in crowded tenement districts. It often subjects the neighboring residents and property owners to increased risks from fire and explosion.

Light, Air and Safety

For city building it is not alone necessary that there shall be a plan that will segregate buildings according to use, but it is also necessary that there shall be a segregation according to intensity of building development. This is essential in order to secure to each section of the city as much light, air, safety from fire and relief from congestion, with all its attendant evils, as is consistent with the most beneficial use of the land. Intensity of use should be so regulated that assuming that the entire section should be built up uniformly with buildings of the maximum height and extent allowed, the section as a whole would be appropriately improved.

The maximum beneficial use of any given block or area is dependent on a certain measure of uniformity in its development as regards height, yards and open spaces. Such use would, in general, be enhanced if the property owners could enter into an agreement uniformly restricting the height of buildings and fixing the minimum area of courts and yards. The size of courts and yards is in most cases of as much benefit to a man's neighbors as to himself. It is, therefore, appropriate that each should contribute in substantial equality to the common stock of light and air. There can be no maintenance of healthful conditions of light and air, and no stability of values, if each individual owner is at liberty to build to any height and over any proportion of his lot without regard to his appropriate and reasonable contributions to the light and air of the block.

The zone plan accordingly includes the districting of the city for the purpose of regulating the height of buildings and the area of courts and yards.

Architects Seek Information

In the course of its report at the recent annual gathering of the Underwriters Association of the District of Columbia, the governing committee of the organization said: "Architects and builders are more and more frequently consulting the office in regard to contemplated changes in existing structures or in the erection of new buildings. This service is one which we are always glad to extend and are pleased that it is being availed of more and more as time goes on."

The experience of the Washington Board in the above direction but parallels that of underwriting bodies elsewhere throughout the country and sufficiently attests the growing appreciation of architects and their clients in the fire-safety feature of building operations. The day is rapidly approaching when the architect or contractor who does not know how properly to advise his client in this important direction will find himself at a serious disadvantage and will see business gravitate toward his better informed competitor.

Better Homes for Workingmen

For the purpose of furnishing superior accommodations to the workingmen of Cambridge, Mass., than can be found in the fire- and filth-breeding wooden tenements of the city, the Cambridge Dwelling House Company has recently been formed in accord with the recommendations of the Massachusetts Homestead Commission.

According to the prospectus of the company, it plans to erect dwellings that will rent for from $12 to $21 per month.

To safeguard the interest of the tenants, dividends on the capital will be limited to 5 per cent. Dividends will be cumulative and one per cent will be carried annually to a surplus fund.

The dwellings will be cottage flats—semi-detached two-family type—durably built and attractively grouped around open courts, thus assuring harmonious development in the community.

Each apartment will be entirely separate, with separate front and rear entrances, porches and yards; each will contain living room, small kitchen, bath room, one to three bedrooms, cellar storage, and will be fitted with all the necessary conveniences of modern city homes.

Careful management of the houses will be provided, probably by a woman as friendly rent collector. A sense of responsibility will be given the tenants by remitting to them the balance of their twelfth month's rent, after deducting the cost of repairs during the year.

Speaking of the new departure, A. C. Comey, secretary of the Cambridge Dwelling House Company, said: "The houses to be constructed will be of brick or concrete for the exterior walls, with a brick, tiled, or brick-nogged dividing wall between each two families in the four-family building. They will afford their occupants greater safety from fire than the ordinary industrial tenement of New England, which is generally of flimsy wood construction, built so close together as to constitute a great conflagration hazard."

Birmingham's Roofing Ordinance Modified

While failing in their effort to secure the repeal of the anti-wood shingle ordinance at Birmingham, Ala., representatives of the lumber interests did succeed last month in gaining a slight modification of the measure, and are considerably elated thereat. As amended, the ordinance permits the repair of wood shingle roofs with material of like kind, if the damage be not in excess of 25 per cent of the total area.

Birmingham had a long and expensive experience with wood shingle roofs, and the strong opposition of Fire Chief S. A. Middleton to the proposed abolishment of the safety measure largely influenced the councilmen in rejecting the specious arguments of the lumber advocates.

Phoenix, New York, Wiped Out by Conflagration

PHOENIX, N. Y., on the morning of September 23 last, was a thriving industrial village containing several thousand constantly employed and well paid citizens. Within twenty-four hours thereafter it was reduced by fire to a mere semblance of its former self. More than eighty buildings—the heart of the village—were reduced to hopeless ruins. All but four of its numerous manufacturing plants were gone. Not a store of any description remained. The direct money loss is conservatively placed at $1,173,000. The indirect loss, of course, cannot be computed, but it will largely exceed that sum. Owners of several of the burned factories have already announced their inability to resume operations under any conditions, while others have been so badly hit that it will be some time before they can accumulate sufficient capital to justify re-entering business. Many of the industrial workers have already gone to Syracuse and other nearby centers in search of employment, never, probably, to return to Phoenix.

Unlike other communities that have been fire ravaged, Phoenix will draw but little upon the insurance companies for rebuilding purposes, it being estimated that not more than 25 per cent of the burned property was insured. Property owners were unwilling to pay the high rate demanded by the insurance men for the assumption of hazards in the community.

Couldn't Afford It

Poor building construction, wood shingle roofs and inadequate fire-fighting facilities supplied the combination that made insurance men fear just what came to pass, and forced them to impose rates that were little less than prohibitive.

Starting in the power room of the Sinclair Chair Company's plant, the fire spread to the mill of the Duffy Silk Company, soon destroying both, and in turn wiping out the Burroughs paper mill, Glass & Breed flour mill, Pierce & Peddergrast mill, M. C. Ryan Company's plant, Sweet Brothers' paper mill, E. F. Loomis lumber plant, Seneca River Power Company's property. Sweeping across the small canal, the flames then licked up the mercantile buildings and such residences as were located in the center of the village, sparks being carried to the latter properties from the inflammable roofs of the manufacturing plants some distance away.

Help summoned from Syracuse, Oswego and Fulton finally succeeded in staying the further progress of the conflagration, but not before the heart of the community had been wiped out and its leading manufactories reduced to ashes.

Commenting upon the Phoenix disaster and the lessons to be learned therefrom, the Syracuse "Post-Standard" said editorially:

Combination that Invited Danger

"The people of Phoenix took no greater chances than the people of many other small industrial communities are taking, but what fearful chances they were! Their water supply and their fire apparatus were hopelessly antiquated and inadequate. They knew it. There were many among them who must have known the conflagration hazard. The insurance men knew, testifying their alarm by the rates they fixed upon the industrial plants on the island. The danger was apparent to all who gave thought to it, and the response was a standing invitation to disaster.

"It is easy to condemn Phoenix, for its calamity is the result of recklessness. But be it remembered that Phoenix has not been exceptionally foolhardy. It has been a typical Eastern factory village, with an alert and intelligent electorate, whose first concern has been the tax rate.

"They demanded no better protection against fire because they felt 'they couldn't afford it.' The mill owners did not install the fire-prevention and fire-fighting apparatus needed within their plants because 'they couldn't afford it.' When the insurance companies responded to their unwise economy with a high rate, they went with little insurance or none at all because 'they couldn't afford it.'

"They took the long risk to save a few dollars a year on their tax bills, or a few thousand on their overhead expenses; and they lost. There are many villages and cities in the East, which boast of their fine factory locations, of cheap homes, and of low tax rates, where there is the same hazard. They are laying the same stake against disaster that Phoenix did. If they win, they are thousands in pocket. When one loses, its loss is millions. That is the lesson of Phoenix to a great many villages and some cities of New York State.

"The recovery of Phoenix will be slow and painful. The village has an excellent location for manufacturing and shipping. There is sure to be a reconstruction of industry there, but unless outside capital is enlisted in a big way the work of rehabilitation will be slow. The men thrown out of work need not remain idle, but it will be in Syracuse, not Phoenix, that they will find employment. There is work here for all who want work. Business is at too high a pitch for the customers of Phoenix mills to await rebuilding, and their contracts will be mostly distributed. Phoenix has not received its death blow, but its injuries are too serious to permit the hope of a prompt recovery."

Tabulating the Nation's Fire Losses

By Charles H. Lum

After several years of patient and intelligent investigation the National Board of Fire Underwriters early in 1914 evolved a comprehensive and entirely practical plan for recording the fire losses of the country, or at least that large percentage of them upon which insurance was carried.

Through a specially created Actuarial Bureau the National Board began its tabulations on January 1, 1915. The system employed in the work, and the benefits that may rightly be expected to accrue therefrom were set forth by Charles H. Lum, who has charge of the Bureau's activities, in a recent address delivered at Reading, Pa., before the convention of the National Association of Mutual Insurance companies.

Excerpts from Mr. Lum's instructive statements are given herewith.—Editor.

The actual work of collecting the amounts of losses paid was begun on January 1, 1915, and this activity now occupies the entire sixth floor of the Bishop Building, at 76 William Street, New York City. There are at present forty clerks and machine operators regularly employed.

During 1915 each loss paid by every company member was reported on a 3 x 5 card, the data being taken from a proof of loss by employees of the company and forwarded to us when payment was made.

Adjuster's Reports

An adjuster's loss report of letter size is now in use for reporting, which carries the same information, with additional data as to adjustment and items covered. These are made out by the adjuster in duplicate for each company, and forwarded with proof of loss. The company inserts in a space provided the proper class number, the claim number, and, upon payment, the date thereof, sending one copy to the Bureau as a report of a loss paid and keeping the duplicate for their files. When more than one company is interested in a loss, a copy of apportionment is forwarded direct to the Bureau by the adjuster, and when the adjustment is on policies of schedule or blanket form, a copy of statement is also furnished.

The reports received each day are stamped with date of receipt and reviewed for deficient information and evident errors or omissions. Reports on losses in which more than one company was interested are then filed with the apportionment until every company member of the Bureau interested in the loss has furnished us with a copy. When complete, the reports are checked up and compared as to classification, cause, etc., and are supplied with the code numbers used in the punch card system. If differences in the classification are found, each company is notified and asked to check the code number given, advising us of any change to be made. Differences of judgment as to the predominant hazard lead to these variations of classification numbers, and such differences are of fairly frequent occurrence. All complete losses are then passed to the typists, who make out two cards, one pink and one green, carrying the same information in a little different order. The pink cards are filed alphabetically by name of assured, regardless of where the fire occurred; the green cards are filed by State, city or town and street. These index or claimant files now contain over a million names.

Reports of fires in States whose laws require companies to report all losses to the Fire Marshal are also copied and forwarded to the State official each day. In 1914 each company was required to report every loss to the Fire Marshal in fourteen States. This work is now done by the Bureau, thereby relieving the company members of duplication and making uniform reports to all States in lieu of the many forms previously in use.

The original loss reports having been coded and claimanted, are next sent to the tabulating room, where a punch card is made for each report. These are filed by States until such time as tabulations are to be made, when they are placed in a machine and sorted to the desired arrangement, and then in a tabulating machine and added. Both the form of loss report and the form of final report were arranged in conjunction with committees of the Insurance Commissioners and the Fire Marshals. Our statistics as to losses are to be compiled in such manner as to show the number of fires, insurance carried, loss paid, and sound value for each class, subdivided by construction and protection. This information is further subdivided for each cause and also summarized for all causes, each State forming a unit.

Losses Upon Dwellings

Our records show that for 1915 the companies reported to the Bureau as paid by them on dwellings and apartment houses without mercantile occupancy the following:

	Buildings	*Contents*
Frame, protected.......	$14,077,356	$6,060,508
Frame, unprotected....	6,774,866	2,445,749
Brick, protected........	2,130,258	1,411,136
Brick, unprotected......	129,755	35,043
Fireproof	8,194	22,826
Or a total of.........	$23,120,429	$9,975,256

This was the paid loss reported for this class for the entire United States. The tabulation for Pennsylvania, which will be placed on the Secretary's desk, serves as an example of the collated information, except that the number of fires is not entered thereon.

In addition to the information now being collected by the Bureau, it is proposed that the companies report the amounts written in order that the loss cost for each class may be arrived at.

Few, if any, realized the volume of the work and the immense amount of detail entailed by the collecting and collating of losses; the volume of amounts written is so huge that the Actuarial Bureau Committee has spent many hours considering the form in which the information would be requested, that is, one which will furnish the information necessary to the Bureau and at the same time not impose too great labor on the company.

During the first year of the operations of the Bureau about 650,000 loss reports were received, showing a fire loss paid by the companies, members of the Bureau at that time, amounting to $153,231,912. ("Insurance by States" gives $166,720,501 as whole paid loss, difference $13,488,587, of which six companies which did not report paid $7,543,178). It is estimated that for 1916 the number of reports of losses paid will approach 1,000,000, the number for the first six months being about 450,000.

Owing to the fact that many of the companies now members did not report at all and that several companies did not join until late in the year and failed to report losses paid previous to their affiliation, it was decided that the returns were too incomplete for publication.

Detecting Fraudulent Claims

Many interesting facts have developed during the year, showing how through ignorance of the assured or through design, companies are being defrauded. All fires due to electricity, explosions, gasolene and lightning reported during a period of two weeks were investigated, resulting in the discovery of eight fraudulent claims, as no fire had occurred.

Probably the most interesting development has been that following receipt of reports from two companies on losses paid on the same property, each company having sworn proof of loss stating that they were the only company interested. Through our claimant files, we are able to discover this duplication of payment and communicate with the companies interested. As a result of information of this kind the company members of the Bureau have recovered several thousand dollars.

Still another interesting item has been shown in losses in which more than one company was interested, which were adjusted separately. Apportionments have been made upon whole losses differing as much as 100 per cent.

This movement is of interest and for the benefit of all companies and associations engaged in the business of fire insurance, regardless of the plan on which they operate. During the latter part of 1914, letters were addressed to many hundreds of the companies and associations, both stock and mutual. All company members of the National Board of Fire Underwriters have now joined and in addition fifty-two other stock companies and fifty-two mutual companies or associations are members of the Actuarial Bureau, making a total of 236 companies at present supporting the work.

Under Efficient Direction

The committee having immediate charge of the Actuarial Bureau is composed of officials of various companies and associations included in the membership: the present committee includes your honored president, L. H. Welch, as representing the mutual interests, and there is a member to represent the interests of joint stock companies not affiliated with the other activities of the National Board. All questions arising, even to details of operation, are submitted to and acted upon by this committee.

At the National Convention of Insurance Commissioners last year the Hon. Jesse S. Phillips of New York said:

One of the most important steps taken by underwriters in their effort to substitute scientific accuracy for experienced guesswork in rate-making has been the formation of the Actuarial Bureau of the National Board of Fire Underwriters. The object of this Bureau is to secure the necessary data for the equalization of rates between various classes of property as opposed to elimination of unjust discrimination between risks of the same fire hazard. This feature of the fire insurance regulation was purposely omitted from the New York law, for the reason primarily that no reliable tables of loss experience were available and the collection of statistics necessary to the tabulation of such experience was a difficult and expensive task. This task which now confronts the Actuarial Bureau is of mammoth proportions, and at least several years will elapse before results of its work may be available as a guide for equitable rate-making.

A Suggested Building Code for Municipalities

By Virgil G. Marani, C. E.

The First Section of This Code Appeared in the August Issue of CONSTRVCTION

Section 2—Special permits, tests and inspection for reinforced concrete, structural metal or special construction

(a) CALCULATION SHEETS

Applicants for permits to alter, enlarge, erect or construct any building or structure, or part of buildings or structures, where there will be used reinforced concrete or framed metal construction, shall at the time of making application, conform to the rquirements of this Ordinance, and shall, in addition to the required plans and specifications, furnish to the Building Inspector for his permanent files all stress sheets and calculations used for the design, and such tests and samples of materials as may be necessary to further determine the safety of the proposed structure.

All required stress sheets, diagrams and tests shall be signed by a competent engineer, architect or builder whose experience fits him to pass upon the design and safety of the structure or building in question.

(b) SPECIAL INSPECTOR AND REPORTS ON REINFORCED CONCRETE CONSTRUCTION

Before any reinforced concrete work is started, the owner shall submit to the Building Inspector, in writing, the name of a special inspector, who shall, at the owner's expense, inspect and pass upon the proper mixing and pouring of concrete and the placing of structural metal.

No reinforced concrete work shall be done without the employment and presence of such inspector, said inspector to be competent and able to conduct these operations to the satisfaction of the Building Inspector and to render to him in writing daily reports of the progress of the work.

Such reports shall contain data relative to the placing or removal of all forms, the cubic yards of concrete laid, and the quantity of cement, sand, and aggregate used each day.

(c) SPECIAL INSPECTOR ON FRAMED METAL CONSTRUCTION

When deemed necessary by him, the Building Inspector shall require the owner to provide and pay for special inspection on metal frame buildings or structures, or on any type of construction where the nature of design deems such action, and the employment of a special inspector necessary to public safety and the proper erection of the building or structure.

Such inspector shall be at all times satisfactory to the Building Inspector.

(d) TESTS OF REINFORCED CONCRETE AND OTHER CONSTRUCTION

Before a building or structure of reinforced concrete, or a building or structure containing reinforced concrete floors, columns or girders is occupied, the floors shall be tested by applying a load equal to two (2) times the figured live load to such parts of the building or structure as the Building Inspector or his deputies may select. The floor shall sustain this load for at least twenty-four (24) hours without cracking or other evident signs of failure. The time for making this test shall be not less than thirty (30) days after the placing of the concrete.

(e) TESTS ON NEW TYPES OF CONSTRUCTION

As a precedent condition of its being used, any new type of construction and material shall be subjected to a similar test, the expense of such test to be borne by the owner, manufacturer or patentee.

(f) LOAD, FIRE AND WATER TESTS

When the nature of any building, structure or material, and the use to which they are to be placed, deems it expedient, the Building Inspector shall require, at the owner's expense, such load, fire and water tests as may be necessary, to determine the safety of the building, structure or material. All such special tests shall be conducted according to the recognized standards for such tests of the American Society for Testing Materials, the National Board of Fire Underwriters, or other equally responsible concerns. In lieu of making such special tests, proper authenticated copies of such special tests as have been conducted elsewhere will be accepted, but the nature of construction and materials used shall in all respects comply with the construction and materials heretofore tested and approved.

(g) STANDARD FIRE TEST

The test herein mentioned and required by this Ordinance shall meet the requirements of the current specifications of the Standard Test for the construction tested, water application, method of testing, etc., prescribed by the American Society for Testing Materials; or the specifications for such test employed at the laboratories of the National Board of Fire Underwriters.

(h) CLASS I BUILDINGS

(Fully Protected)

FIRE TEST FOR FLOORS AND METAL COLUMN PROTECTION

The fire test for floors and metal column protection shall be made on at least one full-size span, and shall be continuous for four hours at an average temperature of 1,700 degrees Fahr.

FIRE TEST FOR MAIN PARTITIONS, ELEVATOR AND STAIRWAY SHAFT ENCLOSURES

The fire test for main partitions, elevator and stairway shaft enclosures shall be continuous for two hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

FIRE TEST FOR ROOF CONSTRUCTION

The fire test for roof construction shall be made on at least one full-size span, and shall be continuous for two hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

MINOR PARTITIONS

All minor partitions shall be entirely of incombustible materials, viz.: materials that will not flame or support combustion.

(i) CLASS II BUILDINGS

(Partially Protected)

FIRE TEST FOR FLOORS

The fire test for floors (when of other than mill construction) shall be made on at least one full-size span, and shall be continuous for two hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

FIRE TEST FOR METAL COLUMN PROTECTION

The fire test for metal column protection shall be continuous for three hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

FIRE TEST FOR MAIN PARTITIONS

The fire test for main partitions shall be continuous for one and one-half hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

FIRE TEST FOR STAIRWAY AND ELEVATOR SHAFT ENCLOSURES

The fire test for stairway and elevator shaft enclosures shall be continuous for three hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

FIRE TEST FOR ROOF CONSTRUCTION

The fire test for roof construction (when of other than mill construction) shall be made on at least one full-size span, and shall be continuous for one and one-half hours, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

MINOR PARTITIONS

All minor partitions shall be entirely of incombustible materials, viz.: materials that will not flame or support combustion.

(j) CLASS III AND IV BUILDINGS

(Temporarily Protected)

FIRE TEST FOR STAIRWAY AND OTHER VERTICAL OPENING ENCLOSURES AND METAL SUPPORTING MEMBERS

The fire test for the required enclosures to stairways and other vertical openings, or for the protection of metal supporting members, shall be continuous for one hour, the temperature rising to 1,700 degrees Fahr. in one-half hour, and averaging 1,700 degrees Fahr. for the balance of the test.

Any subsequent application of water called for in the Standard Fire Tests of the American Society for Testing Materials, or the laboratory specifications of the National Board of Fire Underwriters shall be omitted in the above test for materials used in buildings of Class III and IV (Temporarily Protected Class of Buildings).

FIRE STOPPING

The "fire stopping" required by this Ordinance shall be done entirely with materials that will not flame or support combustion, viz.: *Incombustible materials.*

(k) TESTS OF MATERIALS (General)

Whenever dispute or doubt arises as to the quality of any material or materials entering into any building construction, the Building Inspector may order such test or tests to be made as may be necessary.

All tests shall be conducted at the expense of the owner or owners, and shall be conducted in conformity with the established standards of the American Society for Testing Materials, for such tests.

SECTION 3—EXCAVATIONS, GRADING AND FILLING.

(a) GUARDING EXCAVATIONS

The person or persons making any excavations shall, at his or their own expense, properly guard and protect the same so as to prevent the said excavation from becoming dangerous to life, limb or property.

(b) PROTECTION OF ADJOINING SOIL

The person or persons making any excavation below the established grade shall protect the adjoining soil from caving in.

(c) LIMIT

When any excavation is carried to a depth of nine (9) feet or less below the established grade, the owner or owners of any adjoining or contiguous wall or walls, structure or structures, which may be affected by such excavation shall preserve the same from injury and so support the same by proper foundations that it or they shall be and remain as safe as before such excavation was commenced.

(d) EXCAVATION MORE THAN NINE FEET

When any excavation is carried to a depth of more than nine (9) feet below the established grade, the foundations of all adjoining buildings or structures which may be affected by such excavation shall be extended to the full depth of nine (9) feet by the owner thereof, as provided in Paragraph (c).

The person or persons causing such excavation to be made shall, at his or their own expense, preserve any adjoining or contiguous wall or walls, structure or structures, from injury due to that part of the excavation which is more than nine (9) feet below the established grade, and support the same by proper foundations, so that the said wall or walls, structure or structures, shall be and remain as safe as before such excavation was commenced.

(e) Excavation Adjoining Construction

An excavation may be made to the full depth of any existing foundation on an adjoining lot without liability attaching to the person or persons making such excavation.

(f) Notice to be Given

In all cases where excavating is proposed, the owner or owners of all buildings or structures which may be affected by such excavating shall be notified in writing by the person who proposes to excavate, at least ten (10) days before commencing work.

(g) Building Inspector's Power

If for any cause the person or persons whose duty it shall be to preserve or protect any wall or walls, structure or structures from injury or from becoming unsafe, shall neglect or fail to do so, then the Building Inspector may enter upon the premises and employ such labor and materials and take such steps as may be necessary to make same safe and secure, and the cost of all labor and materials shall be paid by the person or persons referred to in this Paragraph, or become a lien upon the property of said person or persons.

(h) Excavations Near Footings

Excavation near footings shall not be dug below the bottom of any wall pier, column or footing, when any such excavation comes closer than one (1) foot from the natural slope of the soil beneath such wall or footing. This distance shall be determined by the angle of repose of the earth from the bottom edge of said wall or footing.

(i) Grading

The owner or possessor of any lot or land may grade the surface of said lot or land to correspond with the established grade of the adjoining street or public space, provided he gives the adjoining owner or owners, whose land is affected by such grading, thirty (30) days' notice of his proposed grading or improvement.

(j) Retaining Walls

Where necessary, the adjoining owner or owners shall, at his or their own expense, build such retaining walls or foundations as may be required to safely protect his or their land, buildings or structures.

(k) Retaining Walls

The owner or possessor of any lot or land who fills or grades a lot so that the surface of the same shall be above the established grade of the adjoining street or public space, and above the existing surface of any adjoining lot or land, shall, at his own expense, build such retaining walls or structures as may be required to maintain such fill within his own property and protect from damage the adjoining property and structures.

Private Garages a Serious Fire Hazard

Last year there were about 90,000 automobiles in Kansas. The State Automobile Department estimates that this year's total will run to something like 130,000, an increase of about 40,000. Most of the cars in Kansas are kept in private garages on the premises of the owner, usually very close to the house or barn. In nearly all of these garages more or less lubricating oil and gasoline are stored, according to the State Fire Marshal. Much of the gasoline is kept in large quantities. Very few have less than five or ten gallons, and many have as high as a hundred gallons. Greasy rags thrown in the corner have a tendency to breed spontaneous combustion. The oil stored nearby is ready to add to the flames, and the can or tank of gasoline stands ready to do its part by blasting the garage into fragments and throwing flaming liquid all over the neighborhood. Or a spark from a match or from a file on hard steel, or from friction of some sort or other, may ignite the gasoline at any time, with the same result. Lives are constantly endangered and the property of the community hazarded by carelessness in storing and handling gasoline in private garages.

Every garage should be kept as neat and clean as a kitchen. Oily rags should be disposed of promptly to avoid any possibility of spontaneous combustion.

Gasoline should be stored in tanks under ground. Much waste by evaporation is saved in that way and most of the fire danger is eliminated. The State Fire Marshal hopes that the time will soon come when in Kansas all gasoline in quantities of more than five gallons will be stored in underground tanks.

In addition to these precautions, an approved fire extinguisher of some kind should be placed at some convenient point in every private garage.

One of these extinguishers will control a small blaze that otherwise might prove disastrous.

FIRE PREVENTION IN LOUISIANA

At the most recent session of the Louisiana Legislature a series of rules for fire prevention, prepared by the State Fire Marshal, was enacted into laws, going into immediate effect.

Fire Marshal Campbell has arranged for the enforcement of the measures. An inspection of New Orleans, the leading city of the State, is now well under way, and when the work is completed other communities will be taken up in a systematic manner. The net result of the new service should be a very material decrease in the loss record of Louisiana.

At New Orleans, Canal, Iberville, Royal and Bourbon streets were first inspected, and conditions found generally good, though it was necessary to issue orders for a number of changes.

Attention was next directed to the wholesale district along Magazine and Tchoupitoulas streets. Here many things were found contrary to fire prevention laws. It will require several days to complete the inspection of this section. Failure to comply with the instructions of the Fire Marshal lays the offender liable to a fine of $250 or six months in jail. No mercy will be granted persons who disregard instructions of the Deputy Marshals, and prosecution will be instituted immediately.

Important sections from the act are as follows:

"Section 3. Be it further enacted, That no person or persons shall erect or maintain or have in use any chimney, smokestack or other structure for the escape of smoke or heat or gases in such condition as to endanger property."

"Section 14. That all gas, gasoline or oil-burning stoves and heaters shall be placed on iron stands at least five inches clear above combustible material on which they rest, unless the burners are at least five inches from any combustible material."

"Section 16. That all receptacles for ashes shall be be galvanized iron, brick or other incombustible material, and on legs so that the bottom of such receptacle shall be at least five inches clear of the floor."

"Section 17. That no person or persons shall allow to remain longer than twelve hours, or over night, in any alley, sidewalks or within any premises within thirty feet of any building, empty boxes, barrels, rubbish, trash, waste paper, excelsior or other like combustible material, not incident and necessary to their trade or business."

"Section 12. That electrical wiring and equipment of all theaters and moving-picture establishments and construction and installation of all moving-picture machines shall conform in full to the current requirements of the National Board of Fire Underwriters, as contained in the National Electric Code."

Eight Months' Fire Loss Totals $155,525,229

If the ratio of fire loss sustained during the first eight months of the present year continues during the remainder of the period, 1916 will prove one of the most destructive years in the country's history and will again forcefully emphasize the need for the erection and safeguarding of a type of structures that will materially reduce this fearful drain upon the National wealth. Property-owners, architects, builders, municipal officials, and all others concerned in reducing the annual ash heap, should intelligently and concertedly work toward that common end.

According to the carefuly tabulated statistics of the "Journal of Commerce and Commercial Bulletin," of New York city, the fire loss of the United States and Canada for August aggregated $10,745,000, while the total figures for the first eight months of the year were $155,525,229; greater by $48,000,000 than was the loss sustained in the same period of 1915.

A partial explanation of this condition is doubtless the greater laxity in factories and warehouses working under high pressure, where the primary consideration is the rapid filling and despatch of orders, but it is undeniably true that the receipt of war orders induced the erection of a class of structures in which the fire-resisting features were given scant, if any, consideration. Wood has been used freely in the building of such structures, while automatic sprinklers, approved extinguishers and alarm devices have been conspicuous by their absence.

Famous Hotel Prey of Flames

In the burning of the Hotel Normandie-by-the-Sea, near Highlands, N. J., on the 29th ultimo, a notable landmark disappeared, and it is highly improbable that its rebuilding will ever be attempted.

The structure was an imposing wooden affair, its height, area and isolation from efficient fire protection making it a serious fire risk. Although $115,000 was paid for the property in 1885, it had so depreciated in recent years that its latest valuation was $75,000. Normandie-by-the-Sea was of an old type of hotels of which far too many are yet to be found at the resort centers, and their passing will make for greater fire safety to all contiguous property.

Builders of high-grade apartment houses in New York City recently formed an association for the purpose of protection and co-operation. The organization is the outgrowth of the new zoning and height limiting ordinances. J. E. R. Carpenter is president of the association; Alexander M. Bing, vice-president; Edgar A. Levy, second vice-president, and David Tischman, secretary.

Vestibule Fire Stops for Wall Openings

By J. S. Speed, Manager Arkansas Actuarial Bureau

It has always been the opinion of underwriters and rate men that division walls in cotton warehouses should be absolutely blank, without openings of any kind, and all tariffs have so provided. It has been impossible, however, to enforce this rule rigidly, more especially in compresses where the various compartments had large areas, and where blank walls of considerable length required an excess trucking length and labor cost, which was more important than the question of a charge for an opening in the division wall, where such opening was only the thickness of the wall and protected by double standard automatic fire doors.

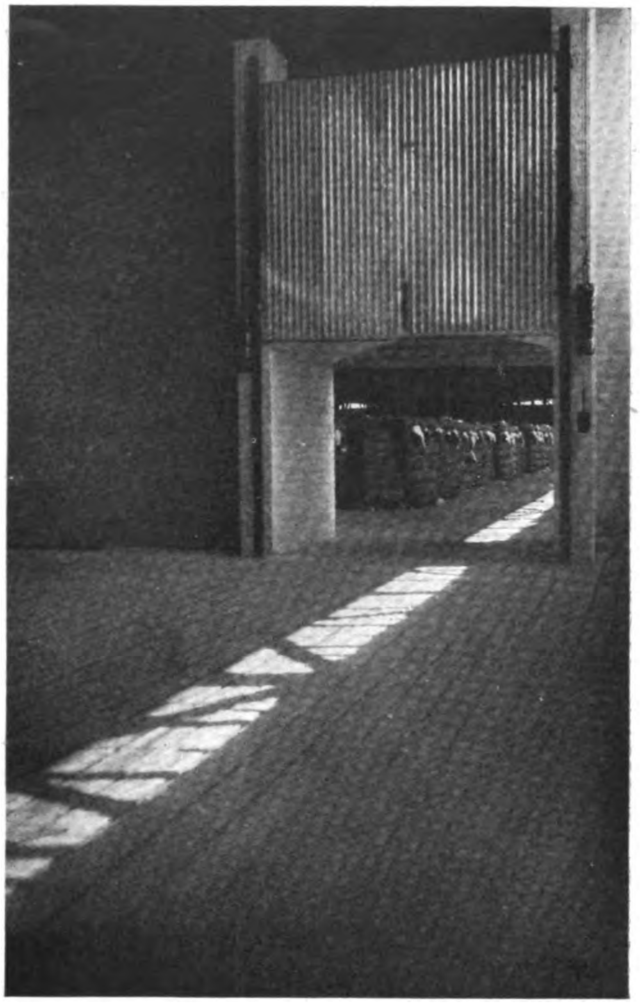
Something over a year ago this question came up in connection with the Pine Bluff Compress & Warehouse Co., and we secured a compromise with the owners, allowing them one opening in a division wall 200 feet in length, provided the opening was protected by a 12-foot brick vestibule built like a vault, with the top properly protected against the falling wall and falling timbers, being made of concrete with heavy steel reinforcement, the fire doors then being attached to each end of the vestibule.

Not a great while after we had secured the installation of this character of protection a fire occurred in Atlanta, Ga., and demonstrated the inability of the ordinary fire doors hung on each side of the wall to stop a flash of fire, as the fire passed through these doors, which afterwards closed by the fusing of the links, but too late to protect the adjoining compartment. Later still, in the Fall of last year, a similar fire occurred in the Pine Bluff plant, and we have every reason to believe that the vestibule opening prevented the flash of fire through the doorway, and the adjoining compartment was saved.

When the marine underwriters agitated the advancement of rates last Winter, and called upon the owners of compresses, more especially at concentration points, to reduce their areas by division walls, and also when the cotton schedule conference was called at Houston, Tex., in February last, for the revision of cotton compress and warehouse schedules, the writer and our engineer, E. D. Murphy, urged very strongly the adoption of a standard vestibule opening to be incorporated in the schedule.

Justified by Experience

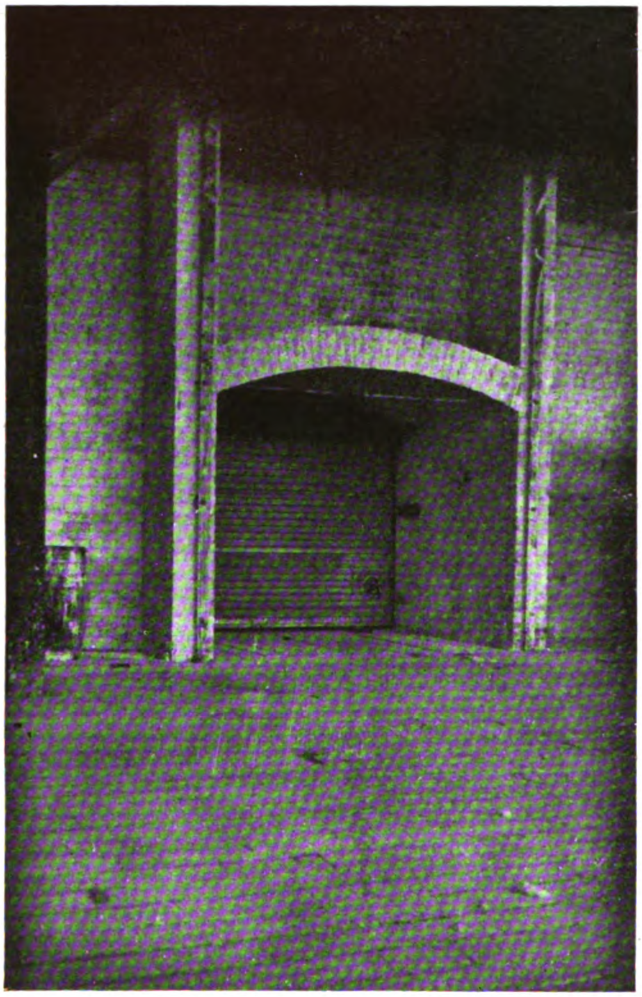
We were unable to secure any co-operation along this line, either from the marine or the Fire Underwriters Associations, but adopted the system for Arkansas, and persuaded the owners of the various properties that the idea was a good one, and, independent of the schedules and marine requirements, have succeeded in securing a vestibule fire stop on every opening in every new wall, with the exception of one individual plant, and we have also secured the additional protection to these vestibule openings of the installation of an automatic fire door release, which operates at any temperature where the rise in such temperature exceeds 15 degrees per minute, and in consideration of the installation of this automatic fire door release, we have reduced the depth of the vestibule from 12 feet over all to 7 feet 4 inches, being 3 feet on each side, plus the thickness of a standard division wall of 1 foot 4 inches.



Division vestibule, separating storage warerooms

Through a misunderstanding, the specifications of the marine insurance companies were delayed, and the improvements agreed upon, in nearly every instance, are still in process and incomplete, but one of the presses has so far completed its improvements as to enable us to secure photographs showing the character of the opening and the character of the protection afforded. Several of these photographs are reproduced herewith.

At the annual meeting in May, of the National Fire Protection Association, the writer called the attention of the organization to the necessity of an investigation of vestibule fire stops and uniform specifications for construction of same, and a committee was appointed on vestibule fire stops, of which the writer was made chairman, the other members of the committee being A. R. Andrews, Austin, Tex.; E. M. Goodwillie, Chicago, Ill.; N. V. Holmes, Chicago, Ill.; J. H. Kenney, Baltimore, Md.; A. M. Schoen, Atlanta, Ga.; J. W. Lord, Boston, Mass. So far no work has been done by this committee, but the writer has called a meeting to be held at Chicago on October 6, following the meeting of the Fire Underwriters Association of the Northwest.



Fire door closed in vestibule division

We believe that the above covers the entire history of the vestibule fire stops for cotton warehouses, although we understand that vestibule fire stops have been used previously in quite a number of cases, on the initiative of the insured, in large manufacturing plants having flash hazards, but we have never had the pleasure of inspecting one of these plants and are not familiar with the construction.

Unqualifiedly Condemn Wood Shingle Roofs

How practical fire-fighters view wood shingles as a roof covering may be inferred from the adoption of the subjoined resolution by members of the International Association of Fire Engineers at their recently held annual convention at Providence:

"Resolved, That it is the sense of this Association that the wooden shingle for roofing purposes be done away with throughout the United States and Canada."

Lumber interests can hardly attribute the above action to the influence of the manufacturers of "substitute" materials, and it will be interesting to learn what tack they will take in seeking to overcome the unbiased opinion of the men best qualified to speak upon the wood shingle hazard.

Agitation at Springfield, Ohio

Business interests at Springfield, Ohio, appreciate the need for a modernized building code for their city and are strongly agitating for its adoption.

McKim, Mead & White, of New York City, have been selected as architects to design and supervise the construction of the $1,500,000 Memorial Building which Newark, N. J., is to erect in commemoration of the 250th anniversary of the founding of the city. Contractors are already at work preparing the site for the intended structure, the corner stone of which will be laid some time during the present year.

Fire destroyed Hotel Edgemere, Lake Quinsigamond, near Worcester, Mass., during the past month. While the property will be rebuilt, the work will not be undertaken until early next year, the 1916 season being practically at an end.

The Town Planning Board of Amherst, Mass., is at work preparing a building code to regulate the distance of houses one from another, to govern sanitary conditions and to secure safety from the fire hazard.

An addition to the present City Hall is under consideration at Chicopee, Mass. It is figured that the work in question would cost in the neighborhood of $65,000.

Following the burning of its extensive plant at Bucyrus, Ohio, a short time ago, with a loss of approximately $100,000, the Carroll Foundry and Machine Company will erect a fireproof structure.

The Editor's Page

IN the busy hours of every day
We pause—
To analyze and weigh
A striking word, or deed, or
thought.

The Importance of Rapid Fire Alarm Service

AS this is to be somewhat of a sermon, it might be well, following the ministerial custom, to choose a text about which to group a few striking arguments.

In the New York *Sun* of recent date, as part of a description of the destruction by fire of "Rattling Spring," the magnificent home of Percy Chubb, near the estate of J. P. Morgan, at Glen Cove, N. Y., appeared four striking lines as follows: "The loss of the Chubb home was due principally to the lateness in the discovery of the fire and the fact that the fire apparatus had to travel two miles."

Within the past few weeks a number of spacious homes, country clubs and high-class farm buildings, all of which were more or less distant from easily available fire-fighting apparatus, have been destroyed by fire, as well as at least three large steamships. In each case a great proportion of the damage would undoubtedly have been avoided if proper automatic alarm systems and means of the extinguishment of incipient blazes had been installed.

There are on the market to-day automatic alarm systems which will give alarm and location of an incipient blaze in a time varying from 15 to 45 seconds from the start of the fire. At least one of these systems is not only installed but is maintained in proper working order by an excellent service plan at very moderate cost. In conjunction with this system chemical extinguishers, which guarantee the rapid extinguishment of any incipient blaze, are installed and inspected.

An inexplicable condition, however, is met with in connection with the marketing of such dependable alarm systems, a condition which goes far to prove that the American public has not a proper fundamental conception of the fire hazard and of sensible fire prevention.

Even among a wealthy class—the owners of magnificent country homes and the house committees of well appointed country clubs, there exists a strong tendency to place the cost factor a long way ahead of the factor of safety. The installation of a dependable automatic fire alarm system which affords in every case an opportunity to get at a fire before it has reached a stage where outside fire-fighting apparatus is necessary would seem in itself to be a most practicable form of insurance against the loss of valuable heir looms and works of art which can never be replaced and for which no insurance can compensate. To have in the house or club or outbuildings a device which not only calls attention by loud alarm to the fact that there is a fire, but also definitively locates the blaze and permits of its immediate extinguishment, should be looked upon as a necessity and not a luxury or an experiment; particularly in buildings which house inflammable objects of great value and are so frequently located in outlying sections.

Certainly, architects who design homes of wealth should investigate this matter of fire alarm thoroughly and should be the first to realize the value of safeguarding their own beautiful creations. To the owners of such homes to whom the expenditure involved is of little importance, the common sense appeal of properly maintained automatic fire alarm systems should render such installation as much to be expected as that of heating, lighting or refrigerating devices.

On shipboard, with the antiquated methods of inflammable design which are ordinarily employed, an automatic alarm or sprinkler system, together with proper cut-offs, would seem to be the only present-day solution of the fire-at-sea hazard, and such protection should be made compulsory by Governmental regulation.

SAFE HOMES—*Editorial*

By Ralph P. Stoddard

What One City Has Done for Constructive Fire Elimination

THERE are a great many people in every community who are awake to the cause of fire elimination and conscientiously want to do something about it.

Much money is spent for fire-prevention work in some cities, but there is no record that the fire loss of these cities has been reduced.

No movement can be carried very far without money. A perfectly good cause will run unsupported just as long as a perfectly good automobile will run without gasoline. Either will go down hill—but that's the end.

Who is going to furnish the money for fire-prevention work?

Who put the good roads movement on its feet?

The manufacturers of automobiles and road-building materials and machinery——

Were they inspired by selfishness?

Certainly!

Does that fact condemn good roads?

Certainly not. The country owes a debt to the men who, through selfish motives (more or less), spent money to educate the public away from mud to permanent, all-the-year-round roads.

By the same token, the cause of fire prevention must be carried on by those whose support can be enlisted upon a basis of selfishness. The makers and dealers in fire-resistive building materials and fire-safety equipment are first to be benefited by a tendency toward fire prevention. They should support the fire elimination movement. But their support does not mean that the movement is not worthy of public support.

The paint interests maintain the "clean-up" movements in all the big cities. Co-operating with city officials, the paint makers and contractors furnish the money to advertise a clean-up week. Yet clean-up week is a good institution and the painters are to be thanked, not condemned, because they support it.

So the public must look upon the makers of all fireproof materials and equipment in this effort to reduce the fire loss and conserve human life by Safe building

The city of Cleveland, perhaps, furnishes the best example of real constructive work for fire prevention. Cleveland is the home of the S-A-F-E, and while this movement for safe building has covered the entire country, its principal activities have been in Cleveland, just as its greatest financial support has been from that city.

What has been done in Cleveland may be done in any other city if the business men interested in fire elimination will show the same enterprise that Cleveland manufacturers and dealers have shown.

The S-A-F-E, organized in June, 1914, set out at once upon a campaign of education to extend the fire limits of the city. No attempt was made to gain political influence and there was no thought of "railroading" a measure through the city council, even had such a thing been possible—which it is not in Cleveland. There was no "gum-shoe" work of any kind.

The entire effort was to point out, through newspaper publicity and advertising, the advantage of Safe building. During the two years' campaign literally hundreds of safe home plans had been printed in the newspapers of the city. Thousands of people have visited the bureau of the S-A-F-E seeking information about Safe homes and their cost.

Interest in Safe building was awakened to a point that made the passage of an ordinance extending the fire limits possible without one word of opposition except of a purely selfish nature. Many hearings upon the measure were had before the council committee. Not one manufacturer or dealer in brick, stone, cement, metal products or other fire-resistive materials appeared before the committee. The secretary of the S-A-F-E attended all hearings and attempted to answer the arguments brought against the measure by lumber dealers. Real estate men spoke in favor of the measure. It was passed by council in September and has received the signature of the mayor.

This ordinance requires that all the frontage of the business streets in two of the largest wards of the city—not formerly in the fire limits—shall be built up of fire-resistive construction. Seven prominent thoroughfares are affected.

Concrete evidence that the educational work for Safe building has its effect on the individual as well as the community is found in the building report for the first eight months of the year. With a shortage of more than $2,000,000 in total building, as compared with the same period of 1915, there is a gain of exactly 100 per cent in the number of fire-safe homes erected and a gain of 74 per cent in the money expended in this class of dwellings.

The Cleveland dealers in brick, tile, metal lath, cement, etc., have supplied materials for $631,000 worth of Safe homes, against $363,000 in eight months of 1915.

With this tendency growing, month by month, and the extension of fire limits already in force, the remaining months of the year will show an even greater gain for Safe materials.

Let the manufacturers and dealers in fire-safe materials of any other community ask the Cleveland members of the S-A-F-E if it pays to back the movement.

The results were not conspicuous at the end of the first year. They are prominent at the end of the second year, and, the principle being right, and the entire principle being based upon service, the results will grow year by year.

Cleveland, notoriously a conflagration hazard, is gradually being made Safe by these increases in Safe building construction.

☘

CONSTRVCTION will be glad to receive from manufacturers of brick and terra cotta, catalogs and data which will be of interest in connection with the brick and terra cotta installments of the Common Sense Home Building Series. These installments are to appear in coming issues.

Further Insurance Recognition for All-Steel Fire Doors

From the Saino Fire Door and Shutter Company, of Chicago, CONSTRVCTION has received certain information of great interest as indicating the progress made by the all-steel factory fire door, in a field hitherto occupied almost exclusively by the tin-clad wood door.

After several years of consideration and the conducting of numerous grueling tests, the Associated Factory Mutual Fire Insurance companies, of Boston, have officially approved and listed the Saino Fire Door. The October list of the companies is the first to contain such approval. The incident should greatly encourage manufacturers of all-steel doors; opening, as it does, a wide field for the introduction of such product.

A further item of interest to the fraternity is the announced concentration by the Saino Fire Door and Shutter Company of its general offices and factories at Chicago, affording greater facilities thereby for handling an ever-growing demand for its output from the Western and Northern territories. The plant, heretofore maintained at Memphis, has been closed.

Does It Pay?

By C. W. J. Melville, C. E., New Orleans, La.

Mix.	Cost per Cubic Yard Materials Only.	Total Cost per Cu. Yd. Complete.	Crush Strength per Sq. In.	Saved Over 1-2-4 Mix.		Loss of Strength from 1-2-4 Mix.	
				Cents per Cu. Yd.	Per Cent.	Pounds per Sq. In.	Per Cent.
1-3-6	$4.44	$15.44	1950	.72	4.5	490	20
1-3-5	4.57	15.57	2030	.59	3.6	410	17
1-2-5	4.93	15.93	2200	.23	1.4	240	10
1-2-4	5.16	16.16	2440	...	...	...	..

IN making up specifications architects and engineers are sometimes tempted to use a leaner mix for concrete than their good judgment would indicate, with the idea that they are making a considerable saving in the ultimate cost of the work.

Some small and unreliable contractors are also in the habit of skinning the mix of concrete, that is, leaving out so much cement as they think the architect will stand for, under the impression that they are making considerable financial gain for themselves.

The following table is worked out with the view of showing that there is very little economy to the owner when the architect specifies a lean mix, and also very little financial gain to the contractor when he skins his mix without the consent of the architect, even though he gets away with it. This table is based upon the average crushing strength of concrete as given by the best authorities on tests made when the concrete is thirty days old. It is based on the following prices for materials:

Cement, $1.90 per barrel, net.
Sand, $1.35 per cubic yard.
Gravel, $1.80 per cubic yard.

All prices are for the materials delivered at the job.

In making up the total cost for the concrete, the carpenter labor, lumber, mixing and placing, and the reinforcing steel have been assumed at $11.00 per cubic yard, which is a very conservative assumption when the present price of steel is taken into consideration.

The first column of this table gives the mix of the concrete; the second the cost of materials required for one cubic yard of concrete; the third column gives the total cost per cubic yards of reinforced concrete in place, including carpenter labor, lumber, labor of mixing and placing the reinforcing steel. The next column gives the average crushing strength of concrete per square inch. The next two columns show the amount in cents per cubic yard and also the percentage saved, using a 1:2:4 mix as a basis. The last two columns show the loss of strength in pounds and also the percentage of loss, using a 1:2:4 mix as a basis.

By studying this table it will be observed that the difference in cost between a 1:2:4 mix and a 1:2:5 mix is only 23 cents per cubic yard, or 1.4 per cent, while the loss in strength is 10 per cent: it will also be noticed that the amount saved between a 1:2:4 mix and a 1:3:6 mix is only 4½ per cent of the cost of the concrete work, while the loss of strength is 20 per cent.

If we take into consideration the total cost of the entire building and assume that the concrete work is one-fifth of the total cost of the entire building, which is the usual percentage, we note that by changing the mix from 1:2:4 to 1:2:5 we save only one-third of 1 per cent on the total cost of the building, while the strength is cut down 10 per cent; while if we change the mix from 1:2:4 to 1:3:6 we save less than 1 per cent on the total cost of the building, while the strength is cut down 20 per cent.

From this tabulation it is easily seen that it is poor economy to skin the mix of concrete, and the old saying, that "The best reinforcement for concrete is cement," is fully verified.

A House of "Chicago" Type

The so-called "Chicago" type of houses, made famous by Frank Lloyd Wright, architect of that city, is rapidly extending its sphere of popularity. Considered a very radical design at the time of its inception in the Windy City a number of years ago, it speedily won many converts there. Now there is scarcely a city in the country which has not a number of homes of this type.

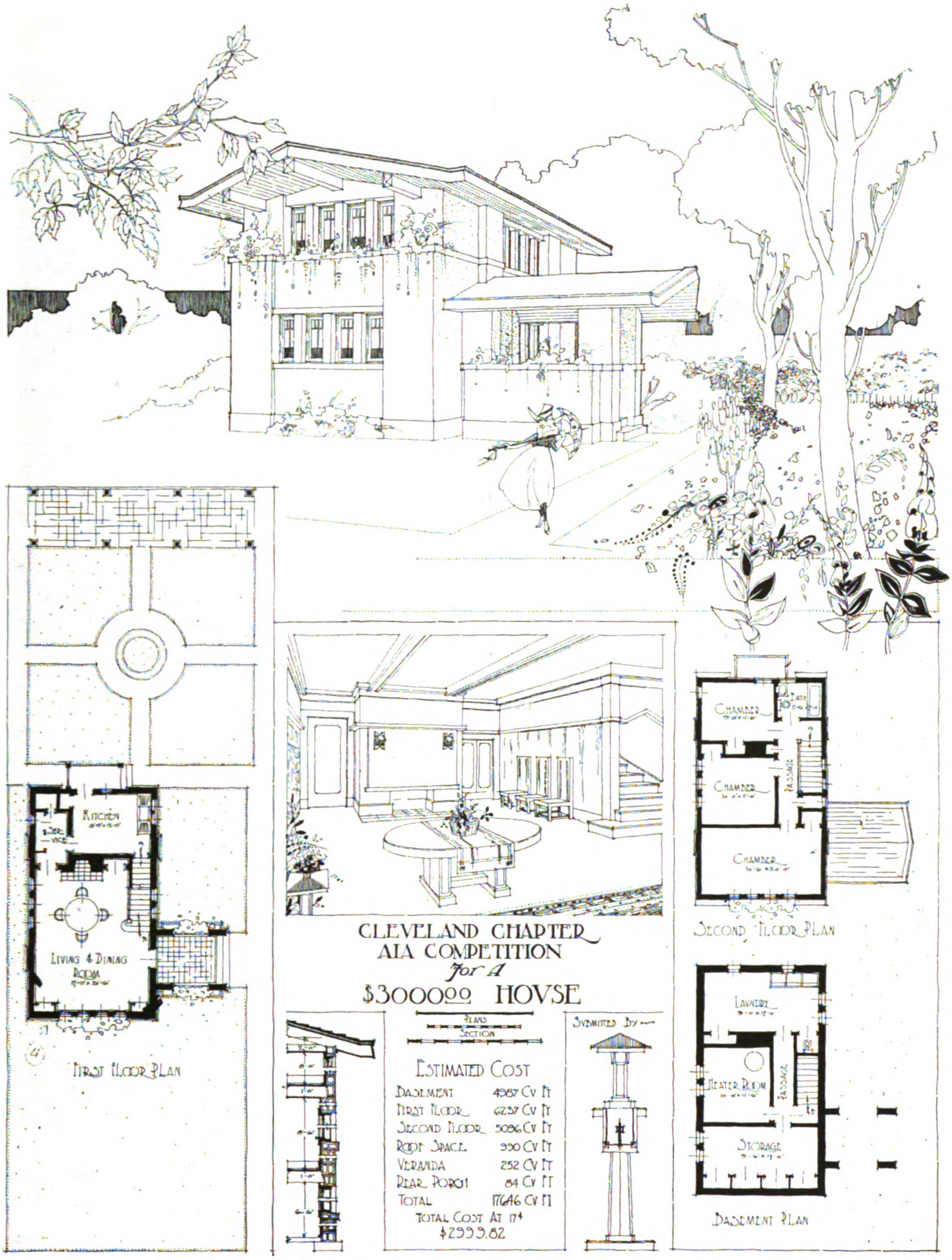
The little house in the accompanying cut is a good example of a modified "Chicago" type. The low-pitched roof, broad over-hanging eaves and grouped windows are typical.

The interior arrangement of this little house is particularly good. The combination of the living and dining rooms is a feature gaining in popularity every day. The service pantry might readily be turned into a breakfast room, providing ample accommodation for the family meals. Three exceptionally good-sized bed rooms and bath are provided in the second story.

The architect, B. Haldane Douglass, of Pittsburgh, designed this little home, to be constructed of hollow tiles, faced with stucco. The cost will be about $3500 for good, substantial construction throughout.

Missouri will probably be the next State to adopt the fire marshal idea, a bill creating such an office having been promised for the next session of the Legislature.

When completed the new plant of the Cumberland Mountain Minerals Company, at Cumberland Gap, Tenn., will have a daily capacity of 30 car loads of Portland cement.



ESTIMATED COST

BASEMENT	4987 CV FT
FIRST FLOOR	6237 CV FT
SECOND FLOOR	5096 CV FT
ROOF SPACE	990 CV FT
VERANDA	252 CV FT
REAR PORCH	84 CV FT
TOTAL	17646 CV FT

TOTAL COST AT 17¢
$2999.82

House of "Chicago type"

Description found on opposite page

National Complete Building Show

NEW YORK, admitted center of American building interest, is to have the next National Complete Building Exposition. It will be held in the Grand Central Palace from March 5 to 11 of next year. Active in its promotion and management will be several of the men who were instrumental in making the Cleveland show of last February such a tremendous success.

Where the Cleveland show was the inspiration of purely local interests and largely an experiment, the New York exposition will be national in its scope and representation. It will have the backing of a splendid precedent and the benefit of the best information and experience resulting from this initial effort. Moreover, it will enjoy unexcelled exhibitive advantages, for the Grand Central Palace was specially planned for this purpose and is really one of the finest exhibition places in America.

One distinct advantage which the New York exposition will enjoy from the outset is the fact that the Cleveland show served well its purpose in educating both the manufacturer and the dealer to the surpassing opportunities of exhibitions of this sort. Exhibitors in the Cleveland show were skeptical and hesitant, when first approached, left the show enthusiastic over the results. Many of them made reservations on the spot for space in the 1918 show, not infrequently doubling their orders.

Of the national advertisers who participated it is altogether likely that all will be represented in the coming exposition. For while Cleveland proved surprisingly productive for them, New York should far excel the Sixth City both in attendance and interest. One naturally expects to find all the unusual attractions in the metropolis. And there is constantly a tremendous transient population there representing every section of the country. A building show, being something distinctly new to most of the country, should exert a wonderful appeal.

Then it is undeniably a fact that the average American mind turns instinctively to New York when considering the de luxe in construction and furnishment. The metropolis is admittedly a magnet of wonderful power for the country at large. So far, to the enterprising manufacturer who has something of unquestioned merit in the material lines the show will offer an exceptional opportunity not only for getting before the prospective consumer, but as well for interesting a new and lusty clientele among the handlers of building materials.

For an especial effort is to be made to bring hundreds of manufacturers, supply dealers, architects, engineers and contractors to New York during the week of the exposition. Already there is assurance that several national conventions will be held there coincident with the show. Several competitive plans are being considered which may swell the attendance from the ranks of the architects and builders. And the general attendance is a foregone conclusion. The Grand Central Palace has arrived as a show place. It is distinctly on the municipal map.

Coming right on the eve of the spring building season, the exposition should prove an effective disseminator of many new and improved ideas for the home builder. It should exert quite as much influence upon the future home of the East as the Cleveland show has done for the Sixth City and northern Ohio. But it will by no means be distinctly a home builders' show.

It will deal with the problems of the commercial and public building as well, demonstrating the most modern ideas, methods and skill in each line. It will feature the latest developments of whatever character both in construction and equipment, and incidentally finish and furnishment will come in for elaborate attention. For both of these become for the average builder a greater question in the finality than was the decision upon the character and kind of building he was to erect.

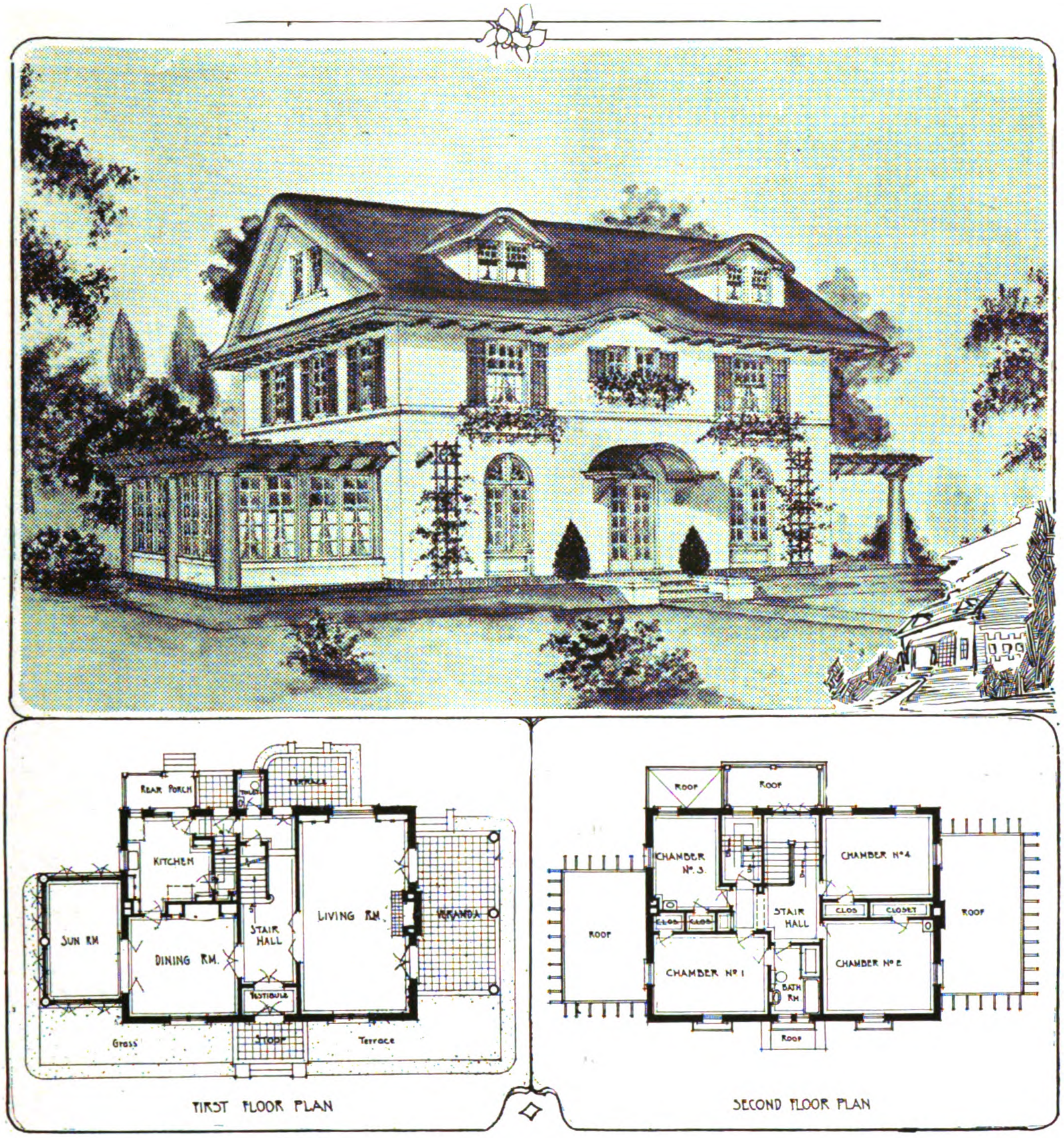
Shows of this kind inevitably give to thousands their first realization of just what the complete twentieth century building should be like. They demonstrate effectively just how much the average home is lacking in all that makes for appearance in finish and furnishings, for convenience in mechanical equipment, for the sense of security, and for genuine, solid comfort.

That is their mission: to educate the people not only how to build but what to use throughout for the greatest comfort and the most lasting enjoyment. And the New York show will be just a little bit the biggest thing ever attempted.

Penalized for Poor Construction

Because of the added fire risk created through the too free use of wood iu building construction, and particularly on account of the large number of wood shingle roofs in the city, the fire insurance companies have increased their rates on properties at Somerville, Mass.

Citizens of the community have been warned by the underwriters from time to time, that if their building code was not radically improved, and the danger from wooden houses corrected, the fire insurance rates would have to be advanced. Failing to heed the warnings, the citizens of Somerville must now pay the penalty.



A Spacious Home

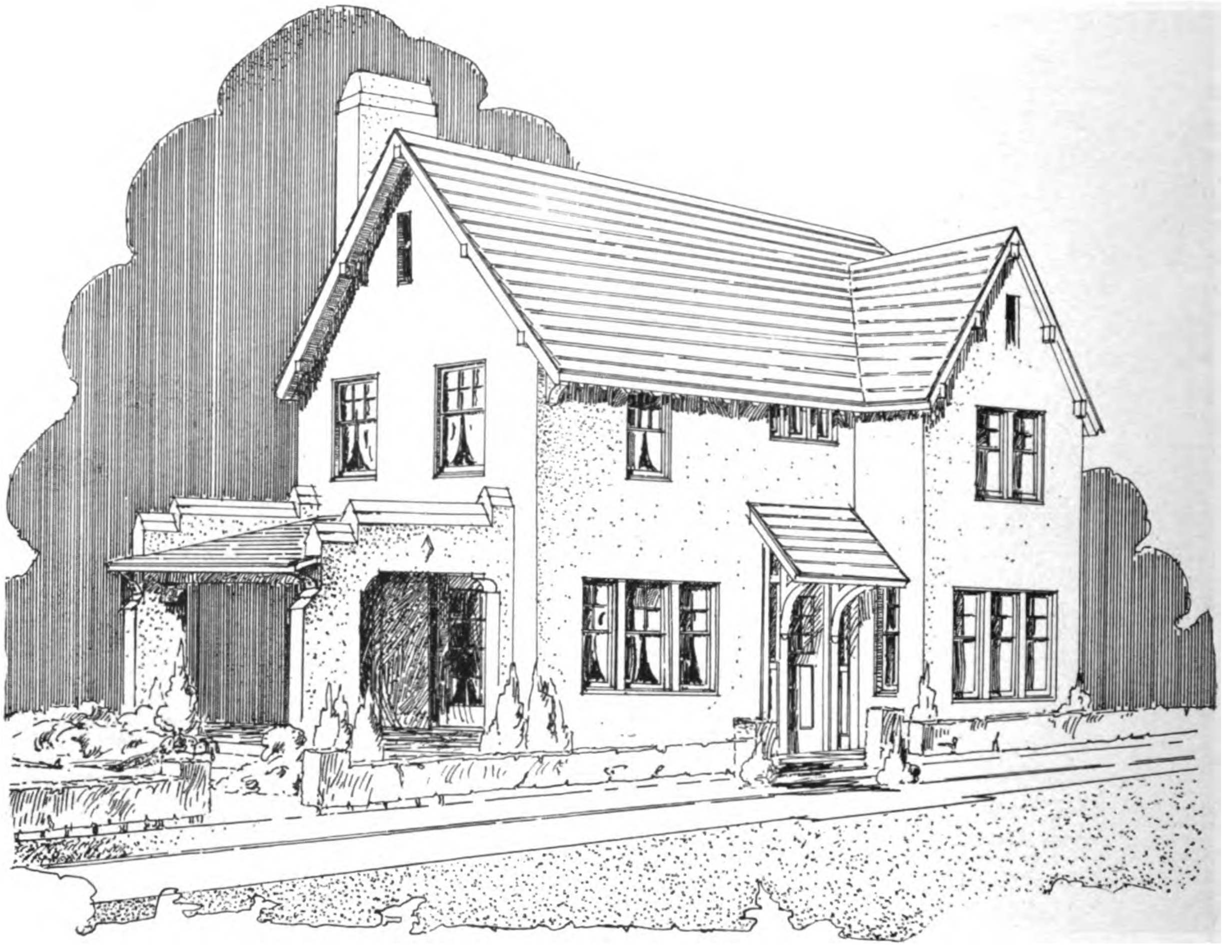
On the "Heights" in Cleveland are built many of Cleveland's finest residences. The location is ideal, the land is fairly high-priced—and the result is a community of homes which are uniformly high-class.

The significant feature of this section, however, is that safe construction predominates. The frame houses are mostly scattered upon the fringe of the section, and even then are few and far between.

The house shown is an excellent example of the better class of houses. It is located in the Shaker district, comprising what originally was the property of the Shakers, who settled there many years ago.

The owner, William Jones, of Cleveland, chose a gray brick, and the architect, Jas. M. Bostick, Cleveland, worked out an excellent design. The roofs are of green tile and the trim of cream color. The result is one of the most beautiful houses about Cleveland.

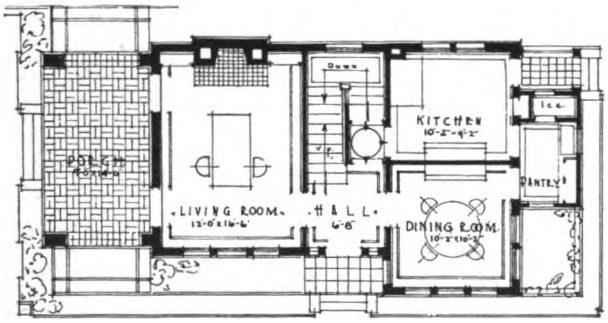
While this is an expensive home, this combination of colors in brick, tiles and trim is readily adaptable to houses of smaller size, in which equally good effects would be attained.



A Colonial Design

The center hall of the Colonial type is a popular feature with housewives. It enables any room to be reached without passing through others and thus saves much cleaning and dusting.

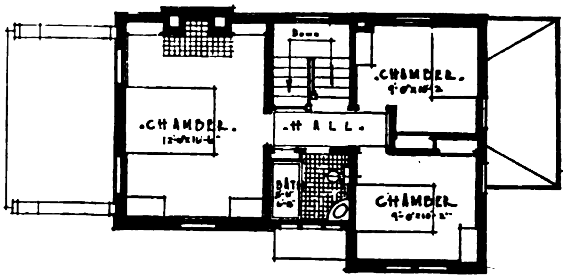
The little house shown possesses many advantages over many of so-called Colonial design. Of these, one is the bay on the front, which provides light and air on three sides of the dining room. The culinary department is exceptionally well taken care of, there being, in addition to the large kitchen, a butler's pantry, with sink and ice-room. The stairways are arranged with a view to economy of space and easy access to all four floors of the house.



First floor plan

The chambers all are good size, one being a real family room, with sufficient room for twin beds and a crib.

While the architect, H. Cecil Frank, of Akron, designed this house for the use of hollow tile faced with stucco, this type is readily adaptable to the use of brick facing—in fact, the original Colonial houses most all were of brick.



Second floor plan

Of average good construction throughout this house could be built for about $4000.

The Use of Portland Cement in Firesafe Homebuilding

(*Continued from page 224*)

briquets, shall show a tensile strength (at seven (7) and twenty-eight (28) days) at least equal to the strength of briquets composed of one (1) part of the same cement and three (3) parts Standard Ottawa sand, by weight. The percentage of water used in making the briquets of cement and fine aggregate shall be such as to produce a mortar of the same consistency as that of the Ottawa sand briquets of standard consistency. In other respects all briquets shall be made in accordance with the Report of Committee on Uniform Tests of Cement of the American Society of Civil Engineers.

Coarse Aggregate. Coarse aggregate shall consist of clean, durable, crushed rock or gravel graded in size, free from vegetable or other deleterious matter, and shall contain no soft, flat or elongated particles. The size of the coarse aggregate shall be such as to pass a one and one-half (1½) inch round opening and shall range from one and one-half (1½) inch down, not more than five (5) per cent passing a screen having four (4) meshes per linear inch, and no intermediate sizes shall be removed.

Aggregate for Wearing Course. Aggregate for the wearing course shall consist of clean, hard, tough, durable, crushed rock or pebbles, free from vegetable matter and shall contain no soft, flat or elongated particles. It shall pass, when dry, a screen having one-half (½) inch openings and not more than ten (10) per cent shall pass a screen having four (4) meshes per linear inch.

3. Mixed Aggregate—Crusher run stone, bank-run gravel or artificially prepared mixtures of fine and coarse aggregate shall not be used.

4. Water—Water shall be clean, free from oil, acid, alkali, or vegetable matter.

5. Color—If artificial coloring material is required, only mineral colors shall be used.

6. Reinforcement—The reinforcement shall meet the requirements of the Standard Specifications for Steel Reinforcement adopted March 16, 1910, by the American Railway Engineering Association.

II.—Construction

7. Forms—The forms shall be substantial, unyielding and so constructed that the concrete will conform to the designed dimensions and contours and shall also be tight to prevent the leakage of mortar. The supports for the floors shall not be removed in less than ten (10) days after the concrete is placed, and then only with the consent of the architect or engineer in charge.

8. Reinforcement—The reinforcement shall be free from dust, scale or coatings of any character which will tend to reduce or destroy the bond, and shall be placed and held in position so that it will not become disarranged during the depositing of the concrete. Whenever it is necessary to splice tension reinforcement, the character of the splice shall be such as will develop its full strength. Splices at points of maximum stress shall be avoided. Splicing by lapping bars without contact and with space between bars along the overlap equal to twice the thickness of the bars is preferable to mechanical splices or clamps.

III.—Measuring and Mixing

9. Measuring—The method of measuring the materials for the concrete or mortar, including water, shall be one which will insure separate uniform proportions at all times. A sack of Portland cement (94 pounds net) shall be considered one (1) cubic foot.

10. Machine Mixing—When mixing by machine, a batch mixer of an approved type shall be used. The ingredients of the concrete or mortar shall be mixed to the specified consistency, and the mixing shall continue for at least one minute after all the materials are in the drum. Raw materials shall not be permitted to enter the drum until all the material of the preceding batch has been discharged.

11. Hand Mixing—When it is necessary to mix by hand, the materials shall be mixed dry on a water-tight platform until the mixture is of uniform color, the required amount of water added, and the mixing continued until the mass is of uniform consistency and homogeneous.

12. Retempering—Retempering of mortar or concrete which has partially hardened, that is, remixing with or without additional materials or water, shall not be permitted.

IV.—Concrete Slab

13. Proportions—The concrete shall be mixed in the proportions by volume of one (1) sack Portland cement, two (2) cubic feet fine aggregate and four (4) cubic feet coarse aggregate.

14. Consistency—The materials shall be mixed wet enough to produce a concrete of a consistency that will flow into the forms and about the reinforcement, but which can be conveyed from the mixer to the forms without the reparation of the coarse aggregate from the mortar.

15. Placing—When it is necessary to make a joint in a floor slab, its location shall be designated by the architect or engineer; joints to be vertical. The concrete shall be placed in a manner to insure a smooth ceiling, and thoroughly worked around the reinforcement and into the recesses of the forms. It shall be

struck off to a surface at least one (1) inch below the established grade of the finished surface of the floor. Workmen shall not be permitted to walk in freshly laid concrete, and if sand or dust collects on the base it shall be carefully removed before the wearing course is applied.

V.—Wearing Course

16. PROPORTIONS—The mortar shall be mixed in the proportions of one (1) sack of Portland cement, one (1) cubic foot of fine aggregate and one (1) cubic foot of "Aggregate for Wearing Course."

17. CONSISTENCY—The mortar shall be of the dryest consistency possible to work with a sawing motion of the strikeboard.

18. THICKNESS—The wearing course of the floor shall have a minimum thickness of one (1) inch.

19. PLACING—The wearing course shall be placed immediately after mixing. It shall be deposited on the fresh concrete of the base before the latter has hardened and brought to the established grade with a strikeboard.

20. FINISHING—After the wearing course has been brought to the established grade by means of a strikeboard, it shall be worked with a wood float in a manner which will thoroughly compact it and provide an even surface. When required, the surface shall be steel troweled, but excessive working shall be avoided.

21. COLORING—If artificial coloring is used, it must be incorporated with the entire wearing course, and shall be mixed dry with the cement and aggregate until the mixture is of uniform color. In no case shall the amount of coloring exceed five (5) per cent of the weight of the cement.

VI.—Protection

22. TREATMENT—As soon as the finished floor has hardened sufficiently to prevent damage thereby, the floor shall be covered with at least one (1) inch of wet sand, or two (2) inches of sawdust, which shall be kept by sprinkling with water for at least ten (10) days. The freshly finished floor shall be protected from hot sun and drying winds until it can be sprinkled and covered as above specified.

23. TEMPERATURE BELOW 35 DEGREES FAHRENHEIT—If at any time during the progress of the work the temperature is, or in the opinion of the architect or engineer will within twenty-four (24) hours drop to 35 degrees Fahrenheit, the water and aggregates shall be heated and precautions taken to protect the work from freezing for at least five (5) days.

PREPARATION OF SLAB—The surface of the slab shall be thoroughly roughened by picking and swept clean of all dirt and debris.

PLACING—The slab shall be thoroughly moist, but free from pools of water when the grout and mortar for wearing course is placed. A neat cement grout shall be brushed on the surface of the slab, the wearing course immediately applied and brought to the established grade with a strikeboard. Grout and mortar shall be used within forty-five (45) minutes after mixing with water.

Cement Blocks

The fact that the mixture of cement, sand and various binding materials may be easily cast and will rapidly harden in various forms has naturally led to the introduction of many types of the so-called cement or concrete block.

Cement blocks are usually moulded on the job and form units which are easily handled, making the wall construction comparatively simple. These blocks are produced from special forms and may have smooth surfaces, or may be shaped in imitation of hewn stone.

The plain concrete finish is pleasing and fully satisfactory to the average homebuilder. Others, however, prefer the hewn stone effect, but usually overdo it. A solid wall of real hewn stone, if it be stone of a solid dull color, is not over-attractive, owing to the monotony of evenly balanced lights and shadows. How, then, will the concrete imitation look? Certainly not as well as a flat wall of even color.

It seems logical to believe that by a combination of the two-wall treatment, hewn stone imitation and plain concrete in one of the attractive stucco finishes, a most artistic and admirable effect could be obtained, particularly if delicate coloring was employed.

One interesting type of concrete block is cast in such a manner as to form the face block with deep concrete furring strips attached. These blocks are made for either 8 or 12-inch walls, and when metal lath or plaster board is applied on the inside strips large air spaces are provided. This block may be faced as desired.

When cement block construction is employed great care must be taken to get machines from concerns of good reputation, avoiding local cast blocks which may be of inferior and weak design. The mix must be made with the greatest of care, following in every detail directions which are usually supplied by the concerns selling or leasing machinery. In no case should cement block walls be of less thickness than that required for brick construction.

In the foregoing paragraphs we have discussed in a general way the various uses of Portland cement in home building, particularly from the fireproofing and structural standpoint. There are, of course, many specific questions which from time to time may arise in connection with the uses of this material. Such questions directed to the office of CONSTRVCTION will be gladly answered; particularly, puzzling questions in regard to specific patented types of concrete construction.

WEATHER: Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., October, 1916 **Priceless**

ANOTHER TOWN WIPED OUT

Down in Virginia the town of Occuguan, housing between four and five thousand people, was almost completely destroyed by fire a short time ago. Practically the entire population had to quickly gather such scant belongings as each person could carry and get out of the place as fast as horse carriages, a few automobiles, or their legs could convey them. None but a few straggling cottages remain, while those who have lost all they possessed have applied for accommodations in near-by and distant villages.

Lumber Advertisement Gutted

Two days after Occuguan lost its identity and was wiped off the face of the map by fire one of the oldest and most famous of Long Island mansions, the Velsor house at Westbury, owned by William R. Grace, was visited by the Active Red Devil and is to-day a mass of charred beams and siding, the loss amounting to over $40,000. Until two months ago the place was occupied by Raymond T. Neilson, the celebrated portrait painter, and much of his valuable furniture (made of the same material as the house) was destroyed.

Summer residents of Westbury, Mineola and North Hempstead, reenforced by the fire departments of all three villages, tried in vain to extinguish the blaze.

Add Another School to the List

A few days after the Velsor mansion fed the flames and went down to the always-to-be-expected defeat, the Woodmere Free School, situated on Broadway, Woodmere, Long Island, was totally destroyed. The loss will exceed $35,000. The blaze was discovered at midnight in the belfry. By the time the firemen arrived the upper floors and the roof were in flames. It became necessary to call on the neighboring villages for aid. Fire companies from Hewlett, Lynbrook, Valley Stream and Lawrence-Cedarhurst responded to the call.

Facts Give Lie to Lumber Advts

What a hollow mockery the assertions of the lumber interests seem, and actually are, in the face of such irrefutable evidence!

What actually happened to the ancient Velsor house may occur any day to every frame structure in the world; and if, in a few instances which but illustrate exceptions, an old wooden building still remains intact, it is naught but the good fortune of a number of circumstances likely at any hour to be withdrawn. Certainly they are at all times never to be relied upon. That safety which they offer should be regarded as worse than nothing. Ever do such conditions present a source of constant apprehension but too well known to the owners of wooden receptacles in which are contained families or business paraphernalia.

The Common Sense Viewpoint

All building operations have at bottom but one objective. Regardless of all questions relating to interior beauty, exterior adornment, etc., the primary idea of every structure is *shelter:* whether it be a home, office building, manufacturing plant, warehouse, hotel, or what not, it is erected to house something of value—people, records, machinery, etc.

In the face of an annual fire loss which easily amounts to several billion dollars, were it possible to compute all economic wastes, and in view of this truth regarding the basic thought in planning a building, our selection of burnable materials is a pitiful farce and a thoughtless tragedy when the results are summed up every year.

Shelter means *Protection*, and the protection that counts is that which *Prevents.* As the most dangerous, as well as the most prolific, cause of building casualities is FIRE, there is no alternative for the individual or corporation planning to build but to select firesafe materials and standard protective devices for every type of structure needed.

WATCH YOURSELF GO BY

Just stand aside and watch yourself go by;
Think of yourself as "he" instead of "I."
Note closely, as in other men you note
The bag-kneed trousers and the seedy coat.
Pick flaws; find fault; forget the man is you,
And strive to make your estimate ring true.
Confront yourself, and look you in the eye,
Just stand aside and watch yourself go by.
Interpret all your motives just as though
You looked on one whose aims you did not know.
Let undisguised contempt surge through you when
You see you shirk, O commonest of men!
Despite your cowardice; condemn whate'er
You note of falseness in you anywhere.
Defend not one defect that shames your eye,
Just stand aside and watch yourself go by.
And then with eyes unveiled to what you loathe,
To sins that with sweet charity you'd clothe,
Back to your self-walled tenements you'll go
With tolerance for all who dwell below.
The faults of others then will dwarf and shrink,
Love's chain grow stronger by one mighty link,
When you with "he" as substitute for "I,"
Have stood aside and watched yourself go by.

S. W. GILLIAN.

The Fireproofing News

"THAT AND THIS"

Frederick B. Stevens, Detroit, manufacturer of foundry facings and supplies, with a building brick department, in "That and This" has brought out a bright, well-printed house organ which has more claims to originality and literary skill than many similar efforts which hardly do more than add to the annual tonnage of commercial printing which finds a quick foundation in innumerable waste-paper receptacles.

While the advertisements at the beginning and end of the booklet bespeak the service of his business, Mr. Stevens cleverly refrains from having too much to say about his plant on the inside pages. His reminiscences, covering a variety of subjects from the history of Detroit to a visit to a jail, and a good talk on Credit, are handled with a facile pen and with quick literary action which begets interest and takes the reader through the commendable issue in lively fashion. Naturally, one wants to know what the author looks like. Mr. Stevens, aware of this, has kindly equipped his booklet with a generous photograph of the boss of the plant—himself. And thus he illustrates that genial good will and engaging philosophy which characterize his readable writings.

The business world can well stand more such booklets as "That and This."

◆

IOWA'S MODEL FARMHOUSE TO BE FIRESAFE

In planning the erection of a model farmhouse on its agronomy farm, south of the college property, Iowa State College recently offered a prize of $50 for the best ideas on farmhouse building. The most representative of these has been chosen, and is being embraced in plans in which firesafe products will have an important part.

The walls and partitions of the model farmhouse are to be of burned clay from the bottom of the footings to the roof. The plan eliminates a large proportion of the fire risk, as the furnace is entirely enclosed in a fireproof room in the basement. The only other fire will be that in the kitchen, the floor of which will be of hollow tile and fireproof.

The cost of the house will be about $4,000. It will have seven rooms and a sleeping porch, all modern in every respect. The structure will be 29 by 31 feet, two stories high, with brick porch columns and floor. Part of the clay products have already been delivered to the site for use in the building of this house.

◆

Don't be prejudiced against new ideas because they invariably surprise you.

◆

COST COMMITTEE COMPLETES WORK

The Cost Accounting Committee of the American Face Brick Association and the firm of accounting engineers retained to co-operate in the work have devised a system of cost keeping for face brick factories. If their recommendations are accepted by members the work of installing the system will be pushed. The committee's report is now being printed and soon will be distributed to members.

◆

Remorse is being sorry, and doing the thing again; Repentance is in seeing you don't "repeat"!

◆

TAMPA TO HAVE BUILDERS' EXCHANGE

Emulating the example of the New Orleans Exchange, Tampa, Fla., is arranging to organize a Builders' and Dealers' Exchange. Ervin Cahow, president of the Cahow Construction Company, Tampa, Fla., is one of the leading exponents of the movement.

The building material men of Tampa believe that each faction represented in the building industry should have its separate association, which would have representation in and co-operate with the main body. The suggestion is also upheld that the general and sub-contractor be assessed a percentage on contracts let in the city. It is also proposed to extend the privileges of the exchange to the architects and engineers, securing their co-operation in the furtherance of the building industry.

◆

"Ullo, mate, wot's up with yer 'and?"

"Smashed me thumb breakin' coal."

"Breakin' coal! Wot was you breakin' coal for—warn't the missus well?"

"ALMETL" DOORS AND SHUTTERS

Merchant & Evans, Philadelphia, Pa., have produced for free distribution to those interested a ten-page folder in two colors and illustrated with line and half-tone plates, descriptive of their Evans "Almetl" fire doors and shutters, on which patents are pending. As the name implies, these products are all of metal, no tin or wood being used in their manufacture. They all carry the Underwriters' label. Complete information may be obtained from branches in principal cities or from the main office, 2019 Washington street.

◆

Not failure, but low aim, is crime—aim high!

◆

TO TEACH CONCRETE BUILDING

Wentworth Institute, Boston, Mass., is to add to its curriculum a course on practical concrete work, the object being the training of young men as concrete foremen and contractors.

This innovation has been made possible largely through the co-operation of the Portland Cement Association, the details having been planned by its Extension Division. J. C. Donaldson, field engineer of the Extension Division, will be located at Wentworth Institute for some while, assisting in setting up the work and then in starting and directing the new course along the lines planned. A number of well-known engineers have encouraged the idea of this co-operative work between the institute and the association.

◆

World service is the new patriotism.

◆

TO BUILD INDUSTRIAL HOMES

The Morey Clay Products Company, Ottumwa, Ia., plans to construct a considerable number of hollow tile and brick homes near its plant for the use of employees, that their lives may be inspired to a higher standard of living. This move has been considered because many of the more than one hundred men and boys employed live at points distant from their work.

The homes are to be of different designs, attractive, home-like, each possessing points of individuality separate from the others. They will be distributed about the plant, not "set up" like rows of tenement structures.

The houses will have modern conveniences. Gas service will be extended by the local company to the new homes. They will be rented at low figures to the occupants.

Such a worth-while move, besides adding to the comfort of the men, will demonstrate the service of brick and hollow tile as a material for permanent, low-cost construction and influence builders of the city in their selection of material.

Such activity means contented labor, freedom from harassing labor troubles, and the gradual gathering of faithful workmen who have a deep interest in their plant and in the man who displays such insight into the needs and desires of those who help to make his business a success. It is sharing success in a way that makes for true mutual welfare. Employer and employee get nearer a common ground which is fast being recognized by both labor and capital.

◆

Teacher—Now, children, here's an example in mental arithmetic. How old would a person be who was born in 1888?

Pupil—Please, teacher, was it a man or a woman?

◆

WANTS CATALOGS

Heraclio Martinez, box 712, Valparaiso, Chile, requests that manufacturers of clay-brick and roofing-tile machinery send him catalogs and full information regarding their product.

◆

Doctor—How do you feel, Colonel, when you have actually killed a man?

Colonel—Oh, not so bad. How do you?

◆

Bert J. Graham, general manager Denison Interlocking Tile Corporation, Cleveland, O., is visiting Tennessee, Missouri and Arkansas in the interests of his company.

◆

The Waterproofing Company, licensee of the Cement-Gun Company, of New York City, has opened its office in the Law Building at Norfolk, Va. A yard has been secured for the storage of equipment.

LUMBERMEN ON THE JOB

The lumber manufacturers of America, through their numerous associations, are planning a permanent display of all the building woods in America, to be installed in the Insurance Exchange Building at Chicago, Ill. Besides all the woods, all the finishes and various types of construction will be on exhibition, so that all interested may get an idea of what may be done in the class of property he is planning to erect.

Cases containing hundreds of panels of woods will be set up. These panels will be in natural and stained finishes. For architects and engineers there will be a special exhibit of treated and untreated woods, good and bad structural material, showing definite examples of what wood to select for every building need. One display will show a large model of mill construction, with floors, roof timbers, pillars and all the interior work of a factory of large proportions.

Four frame houses, to cost $2,000 to $8,000 each, and several farm houses, all in detail model form, will appear. Models of garages, creosoted roads, sidewalks, chicken houses, silos, barns and other structures will be modeled.

Eventually it is planned to install a complete exhibit in every large city in the country, so that prospective builders may readily get full information and see actual models and samples of every type and class of wood construction.

◆

"Was the public dinner you went to a success?"

"It was the best dinner I ever attended. Every speaker who was down for a speech on the program had tonsilitis."

◆

HYDRATED LIME PLASTER

The Hydrated Lime Bureau of the National Lime Manufacturers' Association has issued a series of leaflets regarding hydrated lime and its proper application. Following are the titles. They may be obtained from the Bureau, Arnott Building, Pittsburgh, Pa.:

"Standard Specification for Hydrated Lime," adopted in 1915 by the American Society for Testing Materials, Philadelphia, Pa.

"Concrete Gas Tank Waterproofed with Hydrated Lime."

"Tests and Use of Hydrated Lime," by R. C. Haff.

"Standard Specifications for Hydrated Lime Plaster."

"Hydrated Lime for Use in Concrete."

"Hydrated Lime Plaster for Scratch and Brown Coats."

"Waterproofing Concrete with Hydrated Lime."

◆

The telephone rang and the new maid answered it.

"Hello!" came from the receiver.

"Hello!" answered the girl timidly.

"Who is this?" again came the voice.

"I don't know who it is," said the girl. "I can't see you."

◆

SHEET AND TIN PLATE MANUFACTURERS ORGANIZE

At a recent conference held in Pittsburgh, the National Association of Sheet and Tin Plate Manufacturers, representing about 90 per cent of the independent makers of sheet and tin plate in America, completed its organization, the purpose of which is "to preserve the standards of quality of sheets and kindred products as manufactured by the members and to make uniform changes in such fixed standards of quality from time to time as may best meet the demands of the trade. To place this, one of the most important industries of the United States, on such a broad and sound basis that its business as a whole must necessarily be transacted within the limits of the highest standards known to the business world."

A resolution regarding the contract evil was adopted, recommending the adoption of the proposed contract to be submitted by the American Iron & Steel Institute, mutually holding both parties, in which the feature of a price guarantee and other unsound and unfair provisions are eliminated.

Following are the officers elected: President, W. S. Horner, of W. S. Horner & Co., Ltd., Oliver Building, Pittsburgh, Pa., and vice-president of the American Rolling Mill Company, Middleton, O.; vice-president, James B. Andrews, Andrews Steel Company, Newport, Ky. Executive committee,

W. S. Horner, chairman; E. Langenbaugh, Berger Manufacturing Company, Canton, O.; W. A. Thomas, Brier Hill Steel Company, Youngstown, O.; John O. Pew, Youngstown Iron & Steel Company, Youngstown, O.; G. H. Jones, Inland Steel Company, Chicago, Ill., and W. H. Abbott, Wheeling Corrugating Company, Wheeling, W. Va.

The office of the association is in the Oliver Building, Pittsburgh, Pa.

◆

"Who is that fellow eulogizing 'this grand and glorious republic'?"

"I don't know who he is, but when you hear a man talking like that the chances are ten to one that he thinks this grand and glorious republic ought to support him."

◆

$3,500,000 BRIDGE OVER OHIO

There will be 19,000 tons of steel, over 90,000 yards of concrete and 120,000 barrels of cement used in the construction of the $3,500,000 bridge of the Paducah & Illinois Railroad over the Ohio River. When the structure is completed next year a great route will be connected up, linking the Atlantic Coast Line and Louisville & Nashville railroads with the Chicago, Burlington & Quincy Railway and the Great Northern Railway. The bridge will represent the realization of a gigantic transportation dream of many years.

This notable engineering feat is being accomplished at a point opposite Metropolis, Ill. From an engineering standpoint the structure is of more than common interest, as it will have one of the longest simple truss spans of any bridge in the world, the main channel span being 720 feet, and this, according to an official statement, "exceeds by 45 feet any similar span already erected." Founded on a thick strata of white quartz sand, the river piers are 75 feet below the water level. There will be headroom under the bridge at high water of 53 feet. The structure will be 5,700 feet from end to end and 3,245 feet long, excluding the approaches.

◆

"Have you laid the foundation for your presidential boom?"

"Yes; I have announced my unwillingness to become a candidate."

NEW FIRESAFE MATERIAL FIRMS

Arkansas Brick & Tile Company, Little Rock, Ark.; $300,000. Will purchase two plants.

Stevens Fire Brick Company, Macon, Ga.; $5,000. Privilege of increasing stock to $250,000.

Evansville Brick Company and Standard Brick Company, both of Evansville, Ind. Consolidation, both plants to be operated by same management under name of latter concern.

Smith Brick Company, Omaha, Neb. To construct new plant at Dorcas and Twenty-first streets.

Architectural Tile Company, Keyport, N. J.; $150,000. To make brick, tile and fireproofing.

Empire Tile Company, Cleveland, O.; $10,000.

Saratoga Fire Clay Company, Cleveland, O.; $20,000. Fire clay and clay products.

Cleveland Builders' Supply Company, Cleveland, O. To erect warehouse and supply yard on ground purchased on west side of city. Undertaking exclusively for west side business of company. The land, costing $20,000, comprises five acres near "Big Four" tracks.

Empire Brick Company, Joseph, Ore. One kiln is ready for burning. Another, containing 200,000 brick, soon to be started.

Superior Tile Company, Montreal, Can.; $40,000. Red brick, tile and sewer pipe.

Mifflin-Hood Pottery Company, Daisy, Tenn. To erect plant to cost $40,000. Special machinery ordered. Plant to start this fall. Floor, wall and roofing tile will be made.

Glasgow Clay Products Company, Glasgow, Va.; $100,000.

Chewelah Brick & Lime Company, Spokane, Wash. Erecting new down draft kiln. Capacity, 50,000 brick. Chimney to be 105 feet high.

Con. Gminer's brick plant, Waupaca, Wis., has erected kiln, capacity 85,000 brick. Two more kilns to follow. Plans considered for installation of machinery for manufacture of tile, sewer pipe and marbles.

Claude Smith Company, Chicago, Ill., will construct for General Refractories Company, Joliet, Ill., 18 kilns of special design.

Choctaw Portland Cement Company, capitalized at $500,000, has just completed a new plant a mile and a half south of Hartshorne, Okla., that will give employment to 200 men and have a capacity of 1,100 to 1,500 barrels of cement per day. This, with the annual turnout of crushed stone, will give the output a value of $1,000,000 per year. This is the second Portland cement plant of the kind in Oklahoma. F. W. Freeborn is president; P. G. Walker, Jr., Tulsa, secretary-treasurer; R. J. Clark, Kansas City, Mo., general sales agent. J. O. Hocker, Tulsa, Okla., is vice-president.

St. Clair Brick Company, St. Clair, Mich.; $75,000. To manuacture and sell brick, tile and other other clay products.

National Fireproofing Company is making rapid progress on additions to its plant at Fort Murray, N. J. When completed it will be about three times present size. The capacity will be doubled.

Binghamton Brick Company, New York; $30,000. To make brick and other clay products.

American Ball Clay Company, Philadelphia, Pa.; $500,000. To deal in clay and other mineral products.

The new plant of the Kittanning Buff and Gray Brick Company, Kittanning, Pa., will soon be in operation. First burn has just been made. This plant is modern in every respect.

Cement Products Company, South Carolina, Ga.; $5,000. To manufacture cement products on large scale; also accessories. Plant will be at Sidney Park; office, Union National Bank Building, Columbia.

National Clay Refining Company, Wilmington, Del.; $75,000. Refining and shipping clays.

Moscow Fire Brick and Clay Products Company, Moscow, Idaho, will begin construction of $20,000 plant on five-acre tract of ground leased for 25 years.

New York capitalists are arranging for the erection of a Portland cement plant in the Province of Buenos Aires; $2,000,000 will be furnished. A six-year concession for the exploitation of certain land in the Sierras Bayas district has been obtained. They hope to produce cement the latter part of 1917. Dr. Richardo C. Aldao is president of the new corporation.

Chicago Refractories Company, Chicago, Ill.; $40,000.

William G. Bohnsack is to erect a $250,000 common brick plant in Chicago, Ill., at Thirty-ninth street and Fifty-second avenue.

The Cuban Portland Cement Company, Havana, Cuba, has purchased limestone and clay properties on Mariel Bay, Cuba, and will erect a plant with capacity of 600,000 barrels per year.

Central Tile Company, New York City; $5,000. To manufacture floor and wall tile.

Bay City Clay Products Company, Bay City, Tex.; $25,000.

Rappahannock Brick Corporation, Richmond, Va.; $40,000.

The Texas Portland Cement Company, Houston, Tex., will this month start operations on what is considered to be the finest cement plant in the world from point of equipment. Two hundred and fifty men will be employed. Initial daily capacity will be 1,500 barrels. This enterprise represents an investment of $750,000. It could not be built to-day for less than $900,000. The burning kiln is 220 feet long. The cement will be made of oyster shells taken from the bottom of the bay.

Home Builders Cement Company, River Rouge, Mich.; $20,000.

Cement Stave Silo Company, San Francisco, Cal.; $20,000.

◆

Railroad Attorney—You are sure it was our Flier that killed your mule? What makes you so positive?

Rastus—He dun licked every other train on de road.

◆

NATIONAL BRICK STATISTICS

According to the recent report of the U. S. Geological Survey, the value of the brick and tile products of this country in 1915 was $125,794,844. Three kinds of brick and tile and miscellaneous products advanced in value in 1915 as compared to the year before. Front brick, valued at $9,535,536, increased $245,913, nearly 3 per cent. over 1914. Drain tile, worth $8,879,264, increased $357,225, or 4 per cent. Fire brick, valued at $18,839,931, increased $2,412,384, almost 15 per cent. Miscellaneous products, valued at $3,716,954, increased $551,130, or 17 per cent. The total product decreased about 3 per cent.

IMITATION THE SINCEREST FORM OF FLATTERY

The Freiburg Lumber Company, at Freiburg, near Harahan, La., and the Lyon Lumber Company, at Garyville, La., are having their entire plants roofed with prepared roofing. The latter job calls for some 6,000 squares, including all the large sheds and dry kilns.

Doubtless both these exponents of lumber contribute to the big lumber trade associations which exploit wood shingles, and though Louisiana is an abundant wood shingle State, they are not taking any chances when it comes to safeguarding their own plants.

In this connection it is interesting to note that H. S. Sackett, forester, estimates, in a recent address, "that the substitute manufacturers are displacing annually about 10,000,000,000 feet of lumber, or 25 per cent of the normal production. Furthermore, some of the substitutes, such as steel freight cars, asphalt shingles and metal lath, are comparatively new and their influence in the future will be even greater than at present. It is also worthy of note that the unit cost of manufacturing several of the substitutes has decreased, such as cement, for example, while the unit cost of manufacturing most wooden articles has increased."

◆

"Pa, what is affectation?"

"Affectation, my boy, is carrying three extra tires on an automobile that never gets more than four blocks away from a garage."

◆

The Berger Manufacturing Company, Canton, O., has brought out a substantial and attractive book of 184 pages, known as Catalog No. 10 and devoted to the great number of firesafe building products manufactured by this concern, including sidings and roofings, flat sheets, tin and terne plate, pipe, gutters, eave troughs, skylights and special sheet metal work, ventilators, galvanized cornices, tinners' accessories, steel ceilings, metal lath, metal lumber, reinforced bars, finials, etc., etc. Catalog No. 10 is regarded by the company as one of its best pieces of advertising literature ever printed for its diversified sheet metal products.

Detroit Steel Products Company, Detroit, Mich., has erected two structures for the manufacture of Fenestra solid steel windows, which will double the capacity of the works.

◆

The Cement-Gun Company, New York City, has issued a booklet, "The Cement-Gun," of some hundred pages, for architects, engineers and contractors. It fully describes the apparatus, product and process. Many photographic views help to a visual conception of the use of the machine, application of the product—"Gunite"—and the appearance of the finished job.

◆

Bird & Son, East Walpole, Mass., have issued an attractive booklet, partly in colors, for architects and builders, describing Neponset firesafe shingles.

◆

The Flintkote Company, 88 Pearl street, Boston, Mass., is issuing a card containing samples of their firesafe shingles in various grades and colors.

◆

When a story came from Burksville about a broody hen adopting a litter of pigs the Brookfield Gazette was not at all surprised and explained it as most natural when one stops to consider the close and cordial relation always existing between ham and eggs.

◆

CAST STONE BLOCKS

Hardly six years ago the first cast stone blocks began to supplant the original dry-tamp process blocks. To-day the granite-faced cast stone block is recognized everywhere as a standard building material of proven strength, durability, economy and general adaptability.

Economy of manufacture has been largely responsible for the rapid advancement and introduction of the new process among block makers. This, with the ability of casting twenty or thirty blocks at one time, absolute waterproofness, assured strength, and improved appearance, made a quick and permanent appeal to progressive block manufacturers. To-day there are from two hundred and fifty to three hundred cast stone block plants in the United States producing the material under one patent, which covers the molding of the blocks in multiples and the applying of the granite facing to the finished article. This is convincing evidence of the efficiency of the process and the practicability of a new building material that is quickly reaching the front ranks of concrete products.

◆

ANTI-NEUTRAL ROOF ADVERTISING

There is really no such thing as absolute neutrality. We are either actively or passively for or against business conditions which confront us. Ofttimes the firm that resolves to stand quietly by and let competitors do the fighting, while it "rings in when the dust clears," actually does more to hinder the common interest and retard the victory than if its members jumped in and did their part in the battle which is common to all and which affects every factor in the industry.

It is refreshing to record the following advertisement from the Kansas City Slate and Tile Roofing Company, Kansas City, Mo. The wording possesses two excellent qualities—it is true and it is graphic. Did all firms interested in firesafe roofing take as definite a stand for their product, more quickly would there dawn a better day for the industry.

"A dry, weathered shingle makes about the finest kindling known. In a closely populated town a brisk wind carries flames over shingle roofs as fire sweeps over sunburnt prairie grass.

"Shingle roofs have been the cause of more general conflagrations than any one thing—a fact easily proved on investigating the recent conflagrations that have swept over a number of cities. The instant the rain of sparks touched the tinder-like roofs, house after house burst into flame.

"Some day there will be a fire in your vicinity. The entire neighborhood will be astir with excitement, with engines puffing, people running, neighbors worried about their tinder-like roofs—smoke, sparks and burning embers raining down upon your roof from the fire nest. All the attention and effort of the fire-fighters is directed toward the house on fire, and the big danger lies in the fire spreading to other roofs while the firemen are fighting the main fire.

"Then it will be comfortable to know—and well worth the money—that the sparks and flying embers will not affect your roof. Such will be the case, providing you protect yourself with a fire-resisting roof."

◆

The Los Angeles Pressed Brick Company, Los Angeles, Cal., has had produced an instructive piece of business literature dealing with the use of burnt clay roofing tile.

◆

He—What is the difference between a gown and a creation?

She—I can't give you the exact figures, but it's a small fortune.

◆

To the H. R. Shaffer Company belongs the distinction of having put on the first Barrett Company 20-year guaranteed roof in Chicago. It is on the Woolworth Building at 219-221 South State street, and has recently been completed. It stands as an example of the best attainable in composition roofs.

◆

The F. C. Sheldon Slate Company, of Granville, N. Y., has had printed "The Roof of Eternal Youth," an attractive catalog containing interesting comments regarding the product of the company. These slates are mined in a variety of natural colors, sizes and thicknesses, and are said to harmonize closely with any individual color schame it is desired to employ. Several pages were devoted to photographic reproductions of slates showing approximately their natural colors.

◆

BOARD OF STANDARDS AND APPEALS FOR NEW YORK

Mayor Mitchel, of New York City, has appointed several members of the new Board of Standards and Appeals, created by the Building Inspection bill passed by the last Legislature. This is in connection with the efforts which are being made to simplify building inspection.

Rudolph P. Miller, who resigned as superintendent of the Bureau of Buildings for the Borough of Manhattan to take part in the revising of the Building Code, has been appointed chairman of the new board. Lancing C. Holden, member of the American Institute of Architects, will represent the architects; Howard C. Baird, a member of the American Society of Engineers, represents the structural engineers; William Crawford, president of the Building Trade Employers' Association, will represent the building trades, and Alfred R. Kirkus and Alfred J. Boulton will represent the building trades of Brooklyn.

Daniel Sullivan, one time secretary of the Bureau of Buildings, has been made secretary of the new board. The new board supersedes the old Board of Examiners.

◆

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of CONSTRVCTION, published monthly at New York, N. Y., for October 1, 1916.

State of New York, County of New York:

Before me, a Commissioner of Deeds in and for the State and county aforesaid, personally appeared George A. Watson, who, having been duly sworn according to law, deposes and says that he is the general manager of CONSTRVCTION, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Constrvction Publishing Company, 1457 Broadway, New York.

Editor—C. Stanley Taylor, 1457 Broadway, New York.

Managing Editor—C. Stanley Taylor, 1457 Broadway, New York.

Business Managers—A. H. Eichholz and G. A. Watson, 1457 Broadway, New York.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Constrvction Publishing Company, 1457 Broadway, New York; G. A. Watson, 1457 Broadway, New York; C. Stanley Taylor, 1457 Broadway, New York; L. C. Watson, Cranford, N. J.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholders or security holders appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

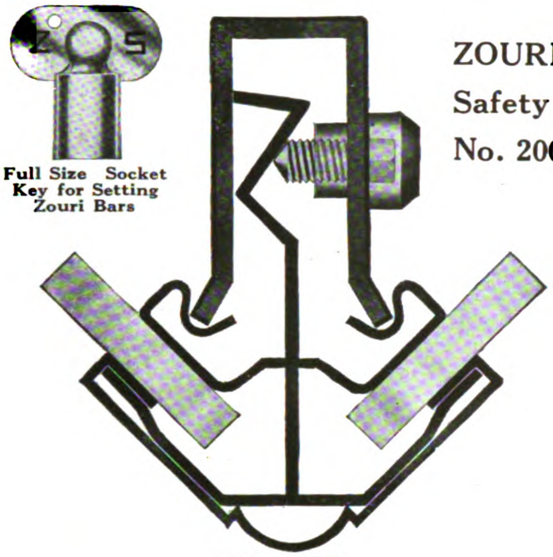
G. A. WATSON,
(Signature of General Manager.)

Sworn to and subscribed before me this 9th day of October, 1916.

[Seal] W. J. SMITH.
(My commission expires April 27, 1917.)

ZOURI

Safety Store Front Construction



Full Size Socket Key for Setting Zouri Bars

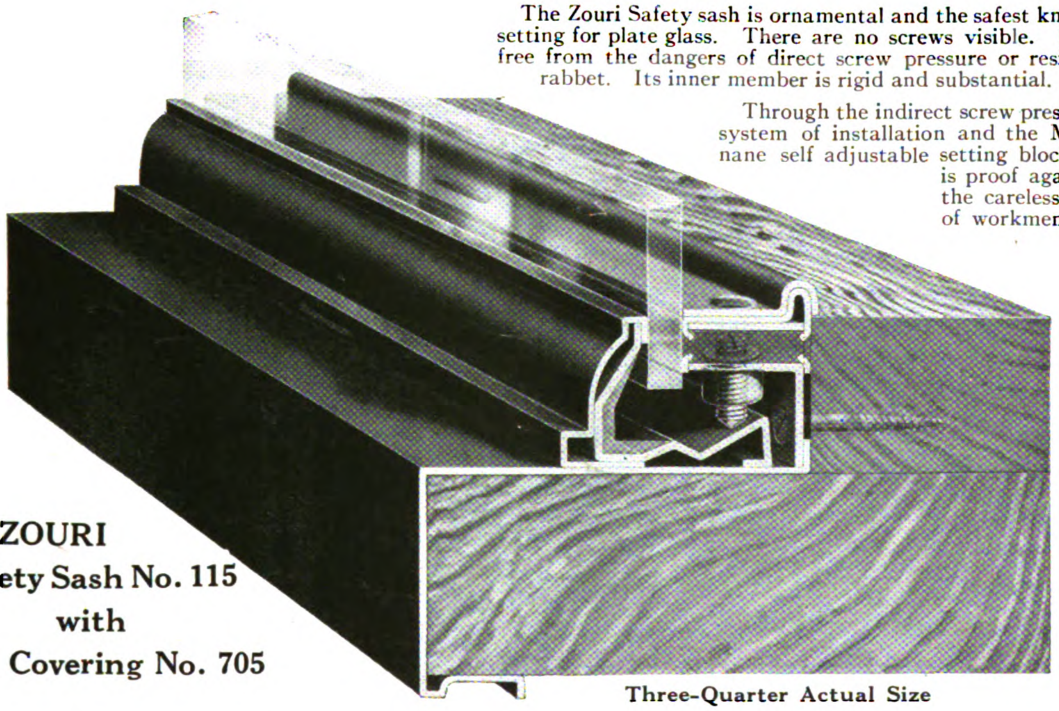
FULL SIZE

ZOURI
Safety **Key-Set Corner Bar**
No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



ZOURI
Safety Sash No. 115
with
Sill Covering No. 705

Three-Quarter Actual Size

DETAILS MAILED ON APPLICATION

Zouri Drawn Metals Company

1813-1833 East End Avenue **Chicago Heights, Illinois**

Operating under Murnane and Marr Patents

AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

"It costs less to prevent fires than to [illegible] losses"

REYNOLDS FIRE SAFE SHINGLES

APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK
H.M.R.
ESTABLISHED 1868

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

ROOFING MATERIAL
CLASS E
ISSUE No 17

If your dealer cannot supply you write the factory.

H. M. Reynolds Asphalt Shingle Co.
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

One-half of a Brick is Service

You not only need brick for your Building Operation but you must have them when you want them.
We have anticipated the demands of a growing city.
Every year we increase our output and our service equipment.
We are now prepared for 1916 BUSINESS.

The Farr Brick Co.

Leader-News Bldg., Cleveland

Your Home is Known by the Company it Keeps

The selection of a site is all important.

When you buy, rent or sell real estate of any kind our services will help.

Our three offices offer unusual facilities to every client.

GENERAL REAL ESTATE

THE CONELLY CO.

Main Office:

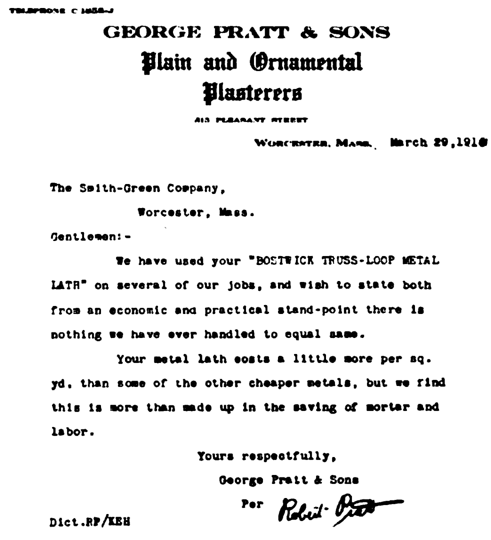
Ground Floor, Williamson Building
CLEVELAND, OHIO

BRANCHES:

East Cleveland, 13592 Euclid Avenue
Lakewood, Corner Belle & Detroit Ave.

"BOSTWICK TRUSS-LOOP" METAL LATH

is not only fire resistant but, but also economical. See what a practical man says—



TELEPHONE C 1658-J

GEORGE PRATT & SONS
Plain and Ornamental
Plasterers
413 PLEASANT STREET

WORCESTER, MASS. March 29,1916

The Smith-Green Company,
Worcester, Mass.

Gentlemen:-

We have used your "BOSTWICK TRUSS-LOOP METAL LATH" on several of our jobs, and wish to state both from an economic and practical stand-point there is nothing we have ever handled to equal same.

Your metal lath costs a little more per sq. yd. than some of the other cheaper metals, but we find this is more than made up in the saving of mortar and labor.

Yours respectfully,
George Pratt & Sons
Per Robert Pratt

Dict.RP/KEH

THE BOSTWICK STEEL LATH CO.,
NILES, OHIO

Do Not Delay Building

Conditions for building never will be more favorable than at the present time.

Let your dream of that Safe Home be realized this year.

We sell every material for the Fire Resistive Building.

Service the best.

Cuyahoga Builders' Supply Company

SCHOFIELD BUILDING **CLEVELAND, OHIO**

. . The . .
BARKWILL BRICK CO.

BRICK and TILE

MADE RIGHT
SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

THE LAKEWOOD MASON SUPPLY CO.
DEALERS IN
BUILDERS SUPPLIES
and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const. Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

OFFICES AND WAREHOUSE:
HIRD AND NICKEL PLATE
LAKEWOOD, O.

for

Converts to Cooperation

Analyze this and the past numbers of Constrvction

Then ask yourself if you ever heard of anyone doing such real service for the fireproofing cause. It is our conception of vital boosting—this jumping right into legislative battles and fighting for ordinances favoring the use of fireproof material in building construction.

CONSTRVCTION is the only publication wholly devoted to consistent fireproofing—it is actively fighting for its constituents—it wants to be measured by the value of the good it accomplishes for your product.

Subscribe for CONSTRVCTION
Get Your Associates to Do Likewise

Help Us to Help You

STUCCO HOUSES
Cost Less Than Frame

Would you like to know how to build a **Stucco** house at less cost than frame?

Would you like to know how to save **33⅓** per cent in cost of the wall construction and get a fire-safe, more attractive, more durable house?

Then write to us today for full information, booklets and cost data on Stucco houses.

Let us prove our claim to you.

The Cleveland Builders Supply Co.
Cleveland, Ohio

QUALITY AND SERVICE CLEVELAND BUILDERS SUPPLY CBS

SOCIETY ADVOCATING SAFE FIRE ELIMINATION

"What Fools these Mortals Be"

An honest business family, consisting of manufacturers, jobbers and retailers, is driving through the forest of distribution to the market place. The woods are beset with hungry wolves, and the only safe route is along the well-marked road of intelligent advertising. The driver is a safe and experienced Advertising director and the members of the party are armed with cash resources, ability and experience, with which they may fight their common enemy, the wolves. They are all anxious to obtain the profits awaiting them at the market place and they show some impatience at the time the journey requires. Finally there is a dispute as to a shorter course to be followed. The manufacturer, the jobber, the retailer and the consumer, each insists on dictating the way. Suddenly they seize the reins and the frightened horses plunge off the established road. Then the men attack each other, each striving to control. Their weapons are turned against each other and immediately their common enemies, Fraudulent Advertising, Dishonest Merchandising, and Unfair Competition come closer to the sleigh. The wolves realize that their victims are being prepared for them. Their jaws snap eagerly in anticipation of the feast. It is evident that the entire party is doomed if the family conflict continues. One by one the members will be dragged down by the wolves. Their fate is inevitable—but harken! Hear those shouts at a distance! Another party is approaching at top speed! There is yet hope, for it is the Vigilance Patrol maintained by The Associated Advertising Clubs of the World. Business will be rescued! The guns of the truth-in-advertising forces will be turned on the marauders and the family will be conducted to the safety of public confidence.

This is one of a series to Advertise Advertising—by the Associated Advertising Clubs of the World (headquarters Indianapolis). The illustration is used through the courtesy of the publishers of "Puck" The text was prepared by Merle Sidener, chairman of the National Vigilance Committee of the Associated Advertising Clubs. Write for booklet, written for buyers like yourself. Every man or woman who buys any kind of commodities will find it profitable reading.

ASSOCIATED ADVERTISING CLUBS OF THE WORLD

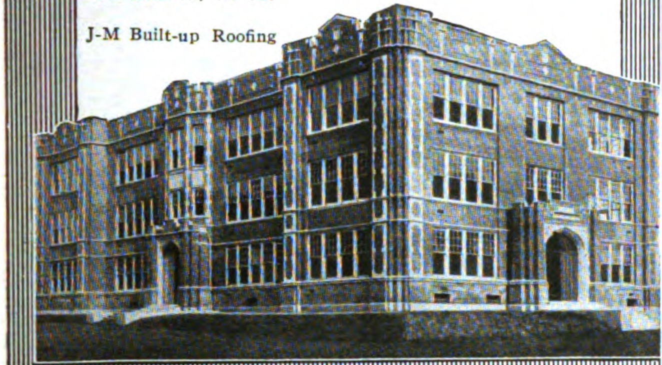
TRUTH

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

J-M Products are not only the result of experience and expert workmanship on materials of the highest grade, but have behind them the backing of J-M Service and Responsibility. They *must* give absolute satisfaction in service.

H. Russ Warner
Architect
Charlestown, W. Va.

J-M Built-up Roofing



Science Hall, Marshall College, Huntington, W. Va.

J-M Asbestos Roofing

owes nothing to the Paint Pot for its long life—It's in the Roofing

And that's the big difference between J-M Asbestos Roofing and the roofing which must be reinforced by paint, stone and slag for its protection from wear and weather.

The fire-resistant and time-resistant properties of J-M Asbestos Roofing are a part of the warp and woof of the roofing itself.

—a solid homogenous felt of two mineral materials—J-M Asbestos Fibre and Trinidad Lake Asphalt. That's why it never needs painting or any other coating. It lasts because every fiber is like every other, equally impervious to all conditions that affect other roofings.

J-M Asbestos Roofing is examined, approved, and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

H. W. Johns-Manville Co.
Executive Offices, 296 Madison Ave., New York

Branches in all large cities

POMEROY FIRE RETARDANT WINDOWS

Not Made to Meet a Price, but to Set a Standard of Service

IT is a sound tenet of building efficiency, as well as of good Methodism, that "cleanliness is indeed next to godliness." A dirty, dusty, grimy building interior is the bane of owner and tenant. Enough dirt will enter, Heaven knows, without using poor windows that constantly admit dust and soot around their sash and casings. Dust-proof windows add to the comfort and peace of mind of the occupant or tenant—and therefore to the income of the owner. The window-wise architect considers the dust-proofness, as well as the weather-tightness, the easy operation, the fire retardant qualities, and the durability, of the windows offered him. **Pomeroy** Windows are as dust-proof as easily-operating windows can be made.

Ask Us To Show How and Why

SAMPLES FILED WITH ARCHITECTS SAMPLES CO. NEW YORK CITY

S. H. POMEROY
COMPANY, INC.
30 EAST 42ND STREET NEW YORK

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

Kno-Burn
TRADE MARK
Expanded Metal Lath

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

North Western Expanded Metal Co.
Manufacturers of all types
of Expanded Metal
958 Old Colony Bldg., Chicago, Ill.

. . *The* . .

BARKWILL-FARR CO.

BRICK and TILE

MADE RIGHT
SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

"The Largest Fire Insurance Company in America"

ORGANIZED 1853

ELBRIDGE G. SNOW, President

"Service" in Fire Insurance

Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.

It means a "SERVICE" to Policy-holders which is unexcelled. The Company's equipment includes:

1. Experts in every branch at its Head Office and in the Field.

2. Agents throughout the United States and its possessions, and in Canada, to write Policies.

3. Complete facilities for the Prompt Adjustment of Losses.

The advice which may be had gratis from the Department of Improved Risks, located at the Head Office, will be found especially valuable to large insurers.

Ask any "HOME OF NEW YORK" Agent, or address inquiry to Department of Improved Risks, 56 Cedar Street, New York City.

ALL BRANCHES OF FIRE INSURANCE

Automobiles, Commissions, Hail, Marine (Inland and Ocean), Parcel Post, Profits, Registered Mail, Rents, Sprinkler Leakage, Tourists' Baggage, Use and Occupancy, Windstorm.

STRENGTH REPUTATION SERVICE

The International FIRESAFE *Building Publication*

CONSTRVCTION

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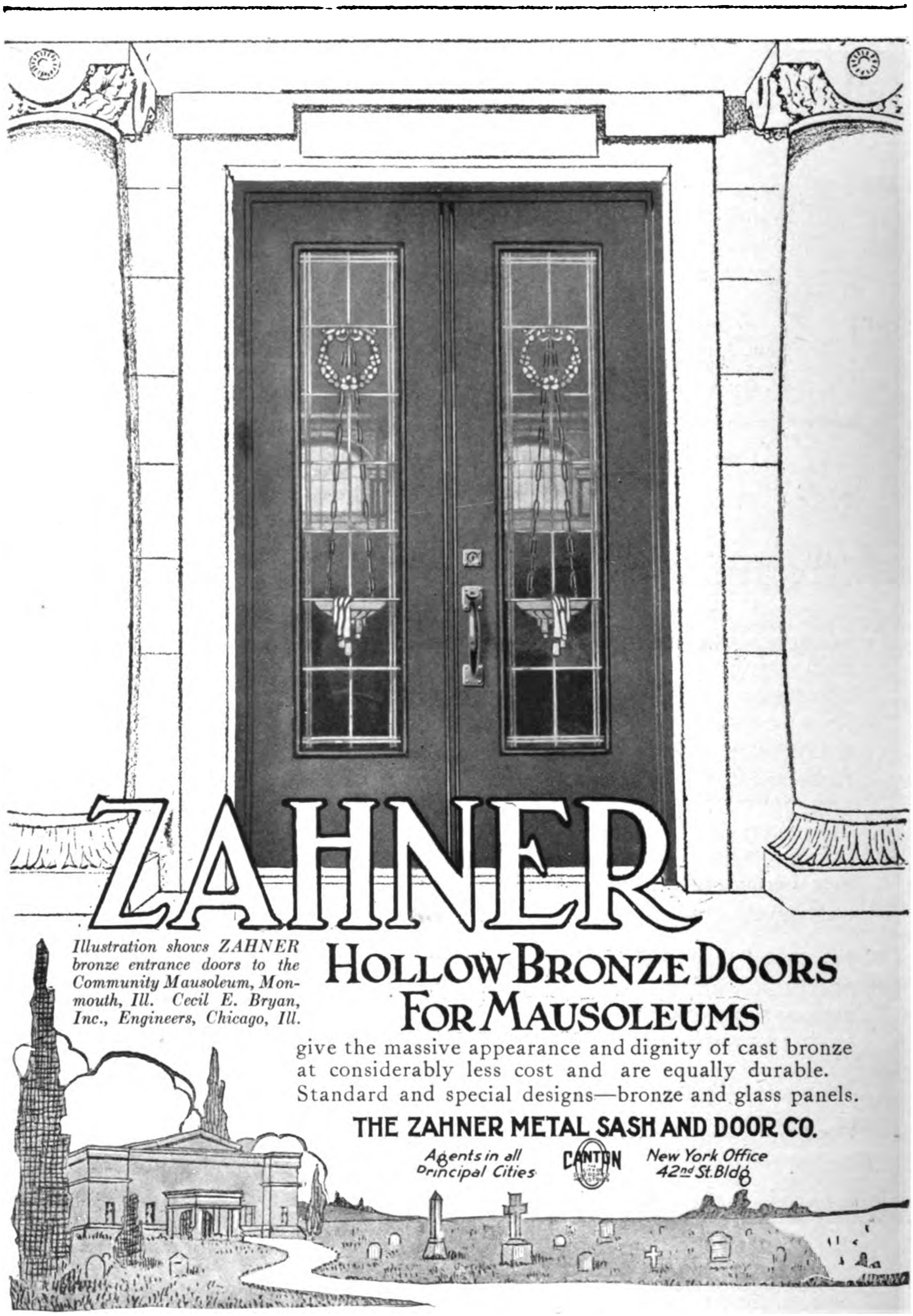
Published on the fifth of each month by Construction Publishing Co., Inc.

GEORGE A. WATSON, Pres.
1457-1463 BROADWAY
New York, N. Y.
C. STANLEY TAYLOR, Sec.-Treas.

Entered as second-class matter November 3, 1915, at the post office at New York, under the Act of March 3, 1879.



ZAHNER

Illustration shows ZAHNER bronze entrance doors to the Community Mausoleum, Monmouth, Ill. Cecil E. Bryan, Inc., Engineers, Chicago, Ill.

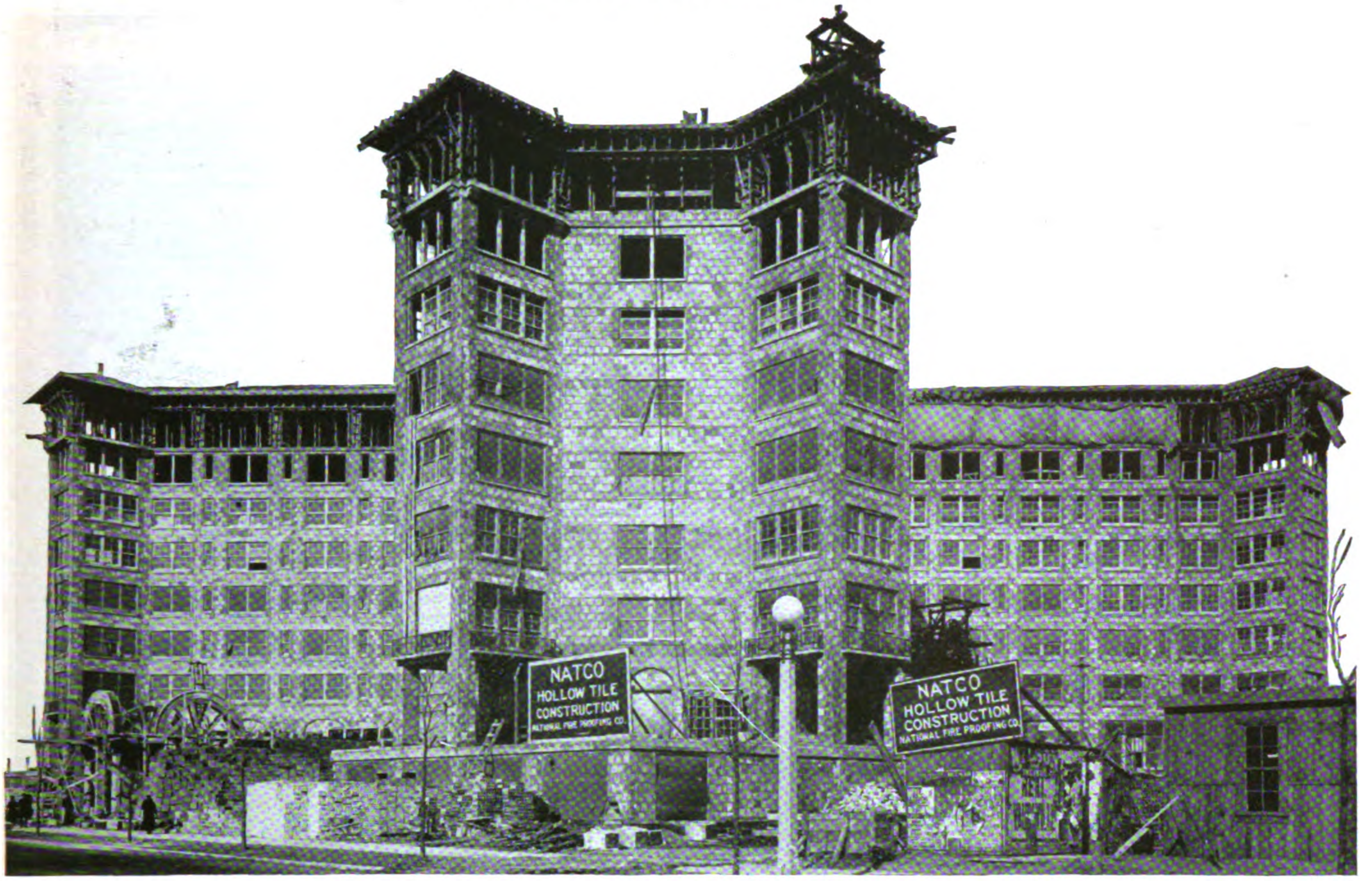
HOLLOW BRONZE DOORS FOR MAUSOLEUMS

give the massive appearance and dignity of cast bronze at considerably less cost and are equally durable. Standard and special designs—bronze and glass panels.

THE ZAHNER METAL SASH AND DOOR CO.

Agents in all Principal Cities
CANTON
New York Office 42nd St. Bldg.

STANDARD FIREPROOFING PRODUCTS.



Edgewater Beach Hotel, Chicago, Ill. Marshall & Fox, Architects; Darling & Eitel Co., Contractors. Nine-story and basement fireproof hotel, constructed with reinforced concrete skeleton frame and 12" NATCO Hollow Tile curtain walls. All columns and spandrel girders faced with Tile, to assure proper bond of the stucco. Exterior stuccoed with Portland Cement, finished with artificial marble surfacing. 1500 tons of NATCO Hollow Tile used in this operation.

NATCO
in Big Hotels

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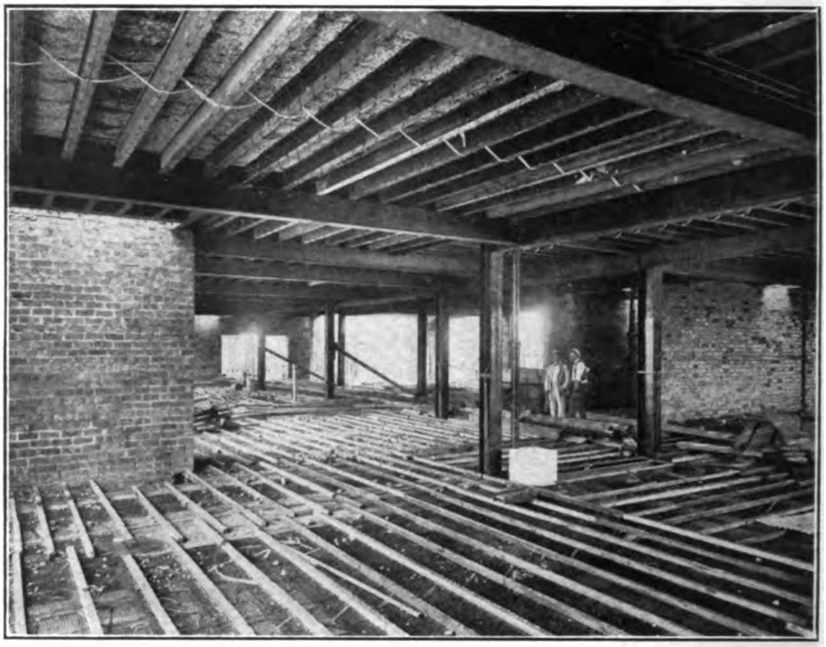

Burns School, Canton, Ohio. Berger's Metal Lumber used for floors and roof. Note Berger's Expanded Metal Lath attached to Metal Lumber and the wood nailing blocks.
Contractors: Melbourne Bros. Architects: C. C. & A. L. Thayer.

The Berger Manufacturing Company, Canton, Ohio

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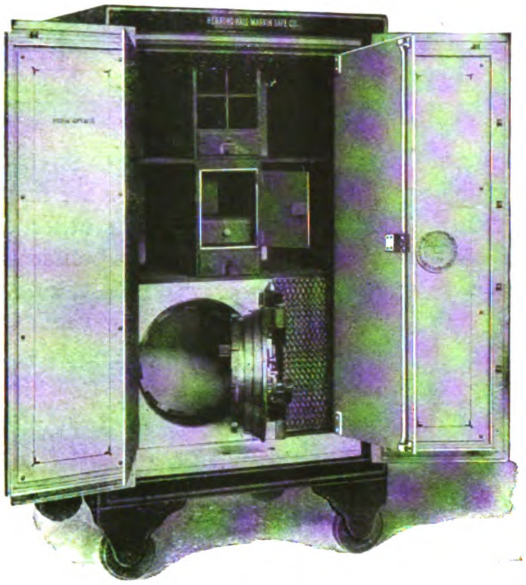

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Architects, Robert G. McDowell & Co., Des Moines.

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¶The FIREPROOFING INFORMATION BUREAU is intended for the use of resident and visiting architects, engineers, contractors and the general business and professional firesafe building fraternity, as well as prospective building owners, to whom its use will be extended gratuitously.

¶Every effort will be made to develop and maintain this Bureau to a high point of efficiency.

¶Prompt coöperation is solicited.

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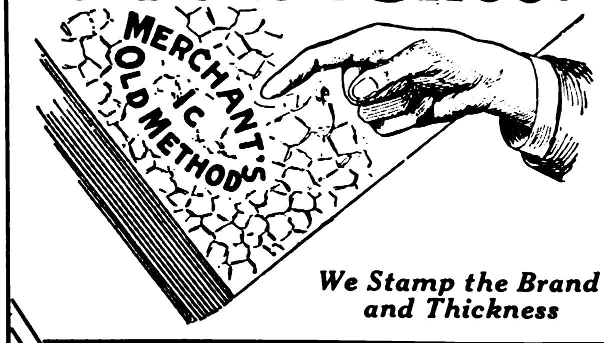

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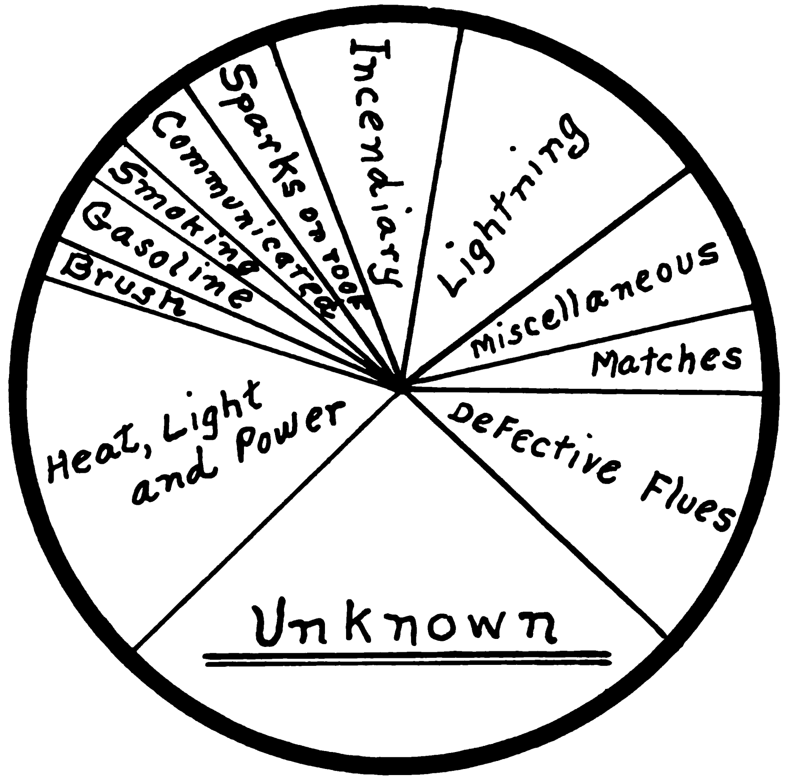
"Fires of Unknown Origin"



The above graphic chart illustrates the ratio of destruction by fires of unknown origin to the total amount of fires in the State of Wisconsin during the year ending June 30th, 1915, as shown by the report of the State Fire Marshal. In this State the recorded destruction by fire for the year was $4,364,195, of which $1,001,455 was caused by fires of unknown origin.

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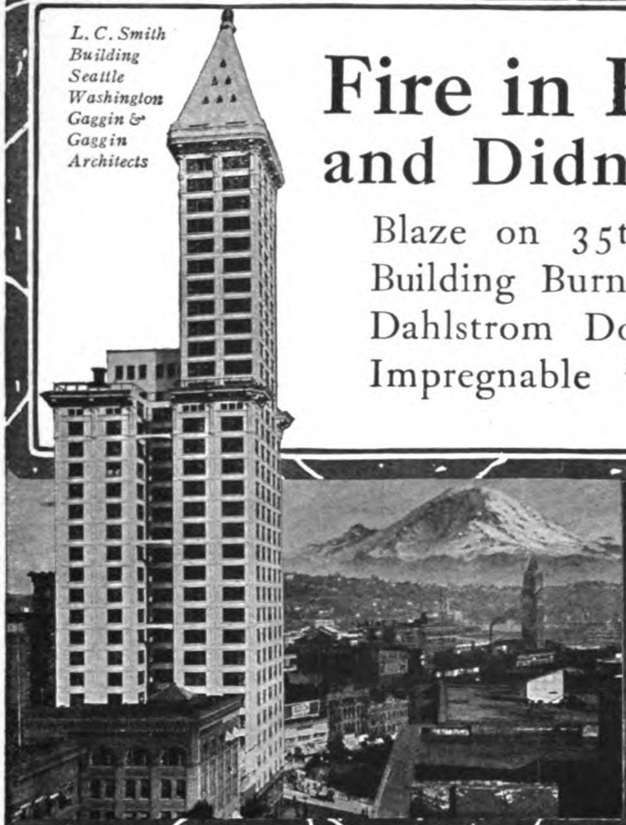

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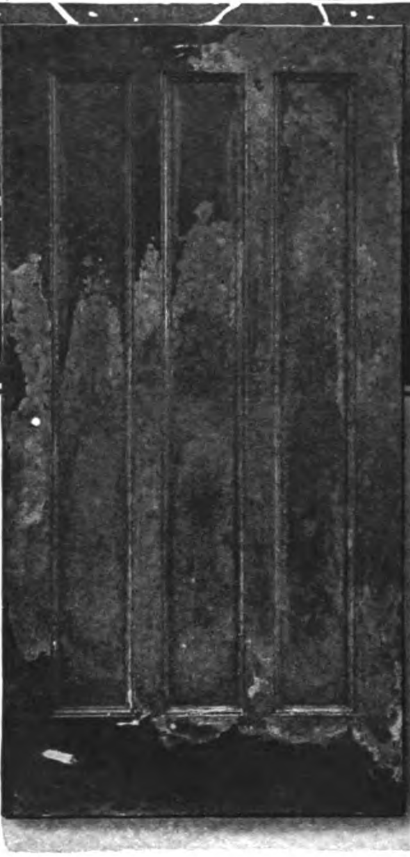
Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.



Door Finish Only Damage Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.

The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.

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Architect, Bruce Price, New York

CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. III NOVEMBER, 1916 No. 5

Fire Prevention in Railroad Shop Property

By Robert Scott, *Superintendent of Insurance, Atlantic Coast Line*

THIS paper* is not in any sense a technical treatise on shop construction or the latest approved methods of fire protection for repair or erecting plants. An attempt will be made to put before you some of the outstanding thoughts that occur in consideration of the general subject of shop property.

The importance of such property is, of course, well known to all of you, and you are also acquainted with the hazards that are peculiar to its operation.

In the case of quite a few railroads, shop layouts are mainly comprised of buildings that have come into existence through some temporary arrangement, and not by reason of any well ordered plan. This condition can probably be traced to lack of funds with some roads, while the scarcity of land and absence of foresight on part of the developers is perhaps responsible for the congestion that exists at many places. It is also a fact that some small plants have been enlarged and pressed into service without proper regard to their adaptability or the hazard from fire. At their inception these plants may have been put up without any thought of permanency, but in the course of development it was found advantageous from an operating point of view to enlarge some of the older structures, erect new ones and install additional machinery.

This same condition is found with industrial and manufacturing plants that in their earlier days had a modest beginning. It cannot be said, however, that such risks are on the Underwriters' preferred list.

The Inherent Hazard

Aside from the conflagration hazard wherein large values become involved, the inherent hazard is probably the most serious one with which we have to deal in the consideration of shop property. This is due to the very nature of the work and the dispatch with which it must be executed. Operations requiring intense heat and the use of volatiles and explosive gases call for constant care and watchfulness if even a fair loss ratio is to be secured.

Fire is sometimes considered a disease; it is caused by unhealthy conditions in a building. These conditions are sometimes organic, that is, part of the building itself; and sometimes functional, that is, part of the operation carried on in a building.

A preventive or some form of treatment must be found and applied if the insurance tax on shop property is to be held to a reasonable minimum, as compared with railroad property used in other branches of the business.

The organic trouble, in the case of new structures, may be overcome by following those standards of construction prescribed by authentic building codes; while present buildings are always capable of improvement and, in most cases, at a moderate expenditure.

The past record of fire losses among shop property should be sufficient argument for the use of fireproof, or at least fire resistive, material in the construction of buildings that constitute the main part of the plant.

Convincing the Architect

Fire protection engineers, on account of their practical knowledge and experience, should be able to convince architects and builders that certain well defined principles must be observed in the construction, arrangement and grouping of shop buildings if fire fighters are to be given a fair chance to extinguish the blaze or at least confine it to the quarter in which it originates.

Such features as the separation of boiler houses, dry kilns and shaving vaults from main shop buildings are too obviously plain to require more than passing comment.

Windows and wall openings should, of course, be so protected by wired glass and automatic doors as to prevent the communication of fire through them.

In view of the ever-increasing use of electric current for light and power, it is important that intelligent attention be given to the hazards arising from electrical equipment, and the National Electrical Code is commended to all those who are charged with the responsibility of installation, maintenance or operation of shop properties where electricity is used.

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* Presented at the third annual meeting of the Railway Fire Protection Association.

The functional trouble may be minimized to a large extent by the appointment of competent administrative heads who will see that a high order of discipline is maintained. That form of discipline is advocated which deals with teaching, instructing and training the mind rather than the form of correction or punishment. It is highly important that employees be taught to have due regard for property rights as a basic principle, and afterwards instructed as to how property can be conserved for the common good of all. This may be accomplished by the distribution of literature that can be easily comprehended and that appeals to the masses; noon hour and evening lectures by inspectors and safety engineers, also by words of commmendation when tests or fire drills are being held, or, better yet, when employees have been successful in extinguishing fire and saving property.

Such practices as smoking on the premises and the careless handling of oils and explosives should be regarded as offenses that call for severe discipline, while a high degree of cleanliness and the very best of good housekeeping methods should be enforced.

Periodical Inspections

Close periodical inspections of all buildings and premises by experienced men are recommended, so that improper practices may not have a chance to grow and no undue risks develop. Such inspections are of great value in producing and maintaining a high standard of cleanliness and order throughout the plant, as the heads of departments are apt to vie with each other in their endeavors to show a clean bill of health.

Having rendered the buildings practically unburnable, but at the same time counteracting this in a measure by the combustible nature of the contents, the most logical step is to provide some means of safeguarding them by extinguishing fires promptly when they occur.

Fire protection adequate to all needs is an essential part of a complete shop plant. This should consist of ample pumping power, also a system of mains and hydrants for delivering water in full force and volume to every part of the premises, even to the extent of coping with a conflagration should one develop.

In all buildings where automatic sprinklers can be used to advantage they should be installed. This means of fire extinguishment is growing in favor each year because of good results produced. Automatic sprinklers are especially adapted for use in the woodworking and upholstering departments. Storehouses and pattern shops should by all means be protected in this manner.

In the case of older plants, it is well to examine this equipment in order to make certain that the fire protection has kept pace with the growth of other facilities. This is an important feature which should be carefully looked after by those in charge of valuable properties.

Well Drilled Fire Brigade

A well organized and thoroughly drilled fire brigade is equally as important as the extinguishing apparatus itself. In selecting men for these duties it should be done with a view of their peculiar fitness; young, vigorous and loyal apprentices usually meet the requirements most acceptably.

Every facility should be given brigade members, and other employees who may likely be called upon to fight fire, to become thoroughly familiar with the fire protection layout, including all valves to be operated in time of fire. Therefore, a general plan of all underground fire lines should be posted at some suitable place for study on part of the men, so that the exact location of this equipment will become indelibly impressed upon the minds of every one of them.

Another important feature to be considered at large shop plants is the fire alarm system. A reliable device should be installed, so that no time will be lost in giving the signal for men to hurry to the scene of trouble, as every minute saved is most valuable, and the lapse of a few seconds may bring about conditions that render it impossible to control the flames before great damage is wrought.

The confining of fire to a small building or section of a larger one may be likened to the first line trenches, for if forced to surrender these the battle may be lost if there are no others to fall back upon.

The Conflagration Hazard

The conflagration hazard is one that does not often enter the minds of those on the ground. This is possibly due to the zeal with which shop men go about their work in an effort to produce as much as possible in a given time. Later-day efficiency methods provide for the elimination of lost motion; this has had the tendency of bringing more machinery under one roof and also causing congestion among the smaller buildings by drawing them closer together.

It is not always possible to stem the tide of a conflagration by means of fire extinguishing apparatus only. Other methods must be adopted which call for foresight in the arrangement, spacing and grouping of buildings, and the separation of large areas by subdividing walls.

The larger cities of our country are turning their attention to the conflagration hazard, and some of them are considering the widening of their streets in order that they may more effectually act as fire stops. Some automatic sprinkler advocates contend that when their method of fighting fire becomes more general there will be fewer conflagrations.

So let us seek to awaken the men to a realization of the fact that the loss of facilities usually means lack of employment, and endeavor to impress upon the entire community that when railroad shops burn they are not always rebuilt in the same locality and that as taxpayers and payroll producers the roads are entitled to all the protection municipalities can afford to give them.

And let us drive home to our executives the conviction that the ever-narrowing margin between income and expense is improved every time a fire loss is averted; that the germ of fire can be controlled if the shop plant begins life with a sound constitution, its premises kept clean and free of unnecessary exposures, also a good circulation maintained by the application of energy in the right direction. We ask for no antitoxins, but earnestly plead for a plain and wholesome diet of unstinted co-operation and *water* in abundance.

SOUTHERN FRAME DWELLINGS IN BAD REPUTE

CONTINUED heavy losses upon frame dwellings located beyond fire protection throughout the South has resulted in the refusal of a number of insurance companies to longer accept such risks, while offices still writing them have reduced the commissions paid thereon to their local agents. Naturally the latter strenuously object to this policy, insisting that rates should be advanced to a point where they will not only meet losses, but will return a small profit to the companies as well. To this proposition the managing underwriters retort that rates have been increased several times within the past few years, but that the losses continue in greater ratio.

As a rule the frame dwellings of the South are poorly built; especially is this true of the flues, which are rattled up without apparently the slightest thought of the fire hazard and are prolific breeders of fire. Another serious fire menace is the wood shingle roof, to which antiquated method of roofing so many of the Southerners cling despite the numerous exhibitions of its fire peril that have occurred in their cities and towns in late years.

Not until sensible building laws are adopted and properly enforced will the menace of the frame dwelling be removed. The growing number of insurance companies declining to insure unprotected properties of this class will tend to materially hasten the day of safe and sane home building in the Southland.

Co-operation

An excellent editorial from "Expanded Metal Construction"

MEN in every line of business are rapidly awakening to the fact that by working with their competitors a large part of the unsatisfactory conditions in their particular industry may be improved if not entirely eliminated. Truthful publicity concerning any product or line of products is best tonic that can be administered to that industry. True co-operation between the members of any industry includes the dissemination of exact information regarding the industry.

The Associated Metal Lath Manufacturers is an organization of the majority of the expanded metal lath manufacturers, whose purpose is to co-operate in improving the conditions in that industry.

The determining of the exact value of any building material requires the employment of extensive and expensive scientific means. This is out of the question for any one individual manufacturer, but is easily and quickly accomplished when several co-operate.

The Associated Metal Lath Manufacturers have conducted fire tests in the East and the West to determine the exact value of expanded metal lath construction from the angle of fire-resisting construction. The results of these tests have been distributed to the architects and builders of the country and have given them information that probably would never have been compiled in any other way.

Tests are being conducted by the Bureau of Standards at Washington for this association to determine the best mixtures to use in connection with metal lath for stucco work. Also to determine what construction methods should be followed in erecting stucco.

The question of obtaining a construction for partitions that will be sound proof is of great importance. The Associated Metal Lath Manufacturers are having an investigation made by one of the largest universities to determine the value of various construction methods.

Arrangements have also been made for a series of tests by the Board of Underwriters, to establish the exact standing of metal lath construction as a fire-resisting construction for all classes of work.

The value of the work of this association to the building industry is that all of this data will be available to every person interested in building from manufacturer to the consumer or owner.

These are things that have been and are being accomplished by this group of manufacturers through co-operation. Other industries and businesses connected with building are working along similar lines.

Architects have had for a long time their national and local organizations. Contractors are working through their local exchanges. Building supply dealers are organizing local and district branches of their national association. Manufacturers of lumber, cement and many other lines are organized to co-operate.

It is possible that some method may be evolved so that a committee on which each of these various interests are represented may be formed. It would certainly present a great possibility for the development of a system approximating perfect building construction, and for eliminating some of the more flagrant evils.

The Logical Advancement of Firesafe Building Construction

By C. STANLEY TAYLOR

AT the conclusion of a very careful analysis of the subject of the construction of buildings of every type in such a manner that fire can neither be communicated to them nor spread from section to section, and a study of what has been done to bring proper knowledge on this subject before the American public, one cannot help being impressed by the vast amount of duplicated effort and misdirected energy which has been expended by many interests having a common object—the encouragement of fire prevention by proper construction, the consequent reduction of insurance rates and a material enlargement of the market for fire-resistive materials and protective devices.

Much time, effort and money has been spent thus in educating the public; and while a vast deal of good has been accomplished, still we are confronted with the indisputable fact that of the total volume of building construction in this country *fully 99 per cent is built to burn, and the fire loss is not decreasing*—in fact, this year will probably show an increase!

What, then, is the logical advancement of firesafe building construction? How can the duplicated effort be merged to produce a better result?

Co-operation, perhaps?

Generally speaking, "co-operation" is a badly abused and sadly misused term—a splendid example of an abstract noun. It constitutes a fine atmosphere with which to cloak some manufacturers' association gatherings, it radiates brotherly love and serves for the moment to cover the knife of unfair and foolish competition, only to be forgotten in the morning. "Co-operation" is beginning to be the circus clown of the English language, wandering aimlessly about behind a foolish smile, starting many things and finishing few—and yet this is the age when co-operation in its highest sense has become the greatest of business factors and needs.

Inherently, in its definition, co-operation is an *active* word—not passive—not merely assenting. It means *to act or work* together for a common end. It is a combination of *action, faith and accomplishment*, never for a moment neglecting the human element, its weakest factor.

Calves and Co-operation

A striking series of comic sketches has recently appeared in several newspapers and municipal publications illustrating the troubles of two calves tied together with a 10-foot rope and each attempting to reach his particular pail of milk—the pails being some 30 feet apart. First the animals strain the rope, each attempting to drag the other in the way he wishes to go. After frantic struggles one gets near his pail of milk only to be dragged away in the direction of the other's goal. Then the tactics are changed and they fight, crashing head on into each other—butting around senselessly while the milk grows cold. Finally an armistice is declared and they commune together, tired by their fruitless efforts. Then comes the bright idea, *co-operation*, and side by side they walk first to one pail, draining it peacefully *together*, and thence to the other to repeat the operation.

Here, in this homely episode, true co-operation is clearly defined. The calves *acted*—they did not merely *agree to act together*. No! They walked over to the first pail and they did not argue again as to *which pail they should empty first*. This was faith, they were working together for the greatest result and they got *all of the milk*, instead of kicking over either one or both of the buckets in a continuation of the senseless struggle!

A Significant Warning!

Herein lies a moral—at once a significant warning and a friendly guide to the fireproofing fraternity, if such a term may be applied broadly to include architects, contractors, prospective builders, insurance interests and the manufacturers of fireproofing materials and protective devices, as well as the producers and distributors of inherently inflammable materials.

There can be no doubt that within the past few years public interest in the matter of reducing the fire waste by the evolution and adoption of safer building practices has been greatly stimulated by the admirable efforts of insurance interests, such as the National Board of Fire Underwriters and the National Fire Protection Association and by various other associated and publicity efforts, having behind them the natural and necessary stimulus of selffish interest. Unfortunately, however, this growing interest has become to a certain extent vitiated by the bewildering array of opposing facts and figures, claims and counter claims placed by the selfish interests before the building public. Through the medium of public print, of advertising and of "selling talk," the invisible slogan—"Nothing is good but what we advocate"—has been heralded abroad.

Let us consider for a moment a few significant facts in connection with this subject of fire losses and unburnable construction.

The annual fire loss is approximately $250,000,000, to which may be added the cost of fire protection to double the amount. What, then, of the *indirect loss?* Every fire causes business disturbance and perhaps the loss of unreplaceable objects. There is a loss as great as the direct loss for which no insurance provides. Add this to the losses enumerated and we have a grand total of close to *one billion dollars a year.* To save this loss, and the consequent loss of lives, is the "common end" for which the American people should "act or work together." In other words, the intelligent co-operation of the building public in the matter of preventing fire losses will have a beneficial result in that it will greatly increase prosperity in this country by the prevention of waste of natural wealth—the foundation of all prosperity.

The Insurance Viewpoint

From the insurance standpoint nothing will do so much lasting good for the business as a material reduction of the fire waste. Speaking frankly of insurance conditions, we will not hesitate to say that the agents, whose earnings of course are based on a share of the premium amount, are naturally very much against any activity which has a tendency to reduce premiums and consequently commissions. This has led to an extended but erroneous opinion that the insurance interests do not wish to have fire hazards reduced because of the resultant lowering of the premium income. This, however, is not the case. The total volume of insurance premiums in this country to-day only exceeds by a very small margin the volume of fire losses plus the expense of conducting the business—a margin, in fact, which would hardly pay 2 per cent on the invested capital. For profits the companies are for the most part dependent on the earnings of invested reserves of past years.

The logical move on their part is to do their utmost to put the business on a sound earning basis by helping to bring about a rapid decrease in the volume of fire losses. Here, then, is the object of co-operation on the part of the insurance interests, and the result has been the formation of the National Fire Protection Association and the National Board of Fire Underwriters—two organizations that have done wonderful work for the cause of fire prevention by advocating consistent firesafe construction and by investigation.

The U. S. Bureau of Standards

Now the United States Government, through the Bureau of Standards, is undertaking an investigation of the structural fire waste of this country and of fire-resistive and fire-retardent materials and protective devices. The object is that of bringing about a reduction of the fire waste and to advance the art and science of firesafe building construction and the development and production of unburnable building materials and of protective devices which are of value in discovering and quenching incipient blazes.

Finally we come to the manufacturers of fireproofing materials and of protective devices. Has there been any co-operation on the part of the industry as a whole? What is the object of such active co-operation? The benefit to the manufacturers of a proper dissemination of knowledge which would tend to bring about an era of firesafe construction is obvious—a vastly increased market for their products. If, as was said in foregoing paragraphs, 99 per cent of all building construction is not absolutely or nearly firesafe, what a wonderful opportunity is here presented to assist in decreasing the disproportionate percentage of safe and unsafe building construction and to enjoy the consequent increase in the demand for firesafe building materials and protective devices! Of co-operation, *active* co-operation, on the part of the manufacturers—more anon.

A Combined Effort Needed

Just what has been shown in the foregoing explanation? Simply this:

The American public has a valuable "common end" to warrant co-operation in the matter of sensibly reducing the fire waste. Architects, contractors and prospective builders, as well as property owners and all those who pay rent, are interested.

The insurance interests have a "common end" to warrant co-operation in the matter of reducing the fire waste.

The United States Government, representing the working brain of the people, has a "common end" in decreasing the fire waste.

The manufacturers of fireproofing materials and protective devices have a "common end" in decreasing the fire waste.

What is more obvious than that they should work together!

How it Can be Done

The next logical subject for discussion is a consideration of how this greater co-operation may be brought about, in what manner it shall "act or work," and what its definite aims and programme shall be.

To properly consider this matter we may best put

CONSTRVCTION will be pleased to have the constructive criticism of its readers regarding the co-operative movement proposed in this article.

it briefly in the form of a table under the headings:

(a) The problem;
(b) What has been accomplished;
(c) What should be done.

The explanation of this table, or skeleton outline, will follow.

SKELETON OUTLINE OF PLAN FOR NATION-WIDE EFFORT TO REDUCE THE FIRE WASTE

The Problem

To perfect a general schedule of building construction which will serve as an universal guide in the matter of selecting and combining structural materials and equipment; and result in obtaining the desired immunity from disastrous fires and the resultant direct and indirect fire loss.

This can be done by:

1. Evolving a national standard building code;
2. By classifying buildings, with and without contents;
3. By the proper testing and classifying of building materials and equipment from the standpoint of fire retardance.

What Has Been Accomplished

1. A suggested building code prepared by the National Board of Fire Underwriters;
2. A suggested building code for towns and villages prepared by the National Board of Fire Underwriters; building code investigations by manufacturers' associations;
3. Adoption of the idea of classification of buildings by the National Fire Protection Association.
4. Test specifications outlined by the American Society for Testing Materials;
5. Tests of materials by
    - Underwriters' Laboratories, Inc.,
    - Factory Mutual Laboratories,
    - United States Bureau of Standards,
    - Private testing stations.

What Should Be Done

1. Evolve a national standard building code by the combined efforts of
    - United States Government,
    - National Board of Fire Underwriters,
    - Factory Mutual Laboratories,
    - Combined manufacturers, manufacturers' associations and the building public, architects, engineers, etc.;
2. Classify similarly, also classify completed buildings with contents;
3. The correlation of all existing knowledge of the fireproofing properties of structural materials and protective devices;
4. The evolution of standard specifications and tests.

It would seem very logical for the national movement toward a reduction of the fire waste to work along the lines laid out in the foregoing skeleton plan.

To evolve a national standard building code, with proper provision for fire prevention, and designed to serve as a guide for all communities, would solve a most serious community problem. The revision or adoption of a local building code always means much argument, the arousing of bitter feeling, and often strong opposition to various clauses by some building material "interest."

A National Building Code

However, a national standard code which would meet with the full approval of the people, the manufacturers and the insurance interests would solve every difficulty.

It is but natural also that buildings should be classified according to various degrees of fire-resistiveness and in like manner *buildings with contents* should be classified. There is, naturally, a great deal of difference between an empty building and one having contents, also a widely varying degree of fire hazard. Certainly, a building constructed throughout of unburnable materials could not burn, but if it were filled with inflammable contents *without proper protective devices installed* it would constitute a serious risk and should not be classified as a fireproof building.

Without further explanation we can pass to that section of the table under the heading "What Should Be Done."

Here the plan provides for a satisfactory national building code by allowing every interest to have a hand in its making. The United States Bureau of Standards, representing the official sanction and police power of the government; the National Board of Fire Underwriters, which, though the Underwriters' Laboratories has already done such splendid work; the Factory Mutual Laboratories, representing another insurance interest; and, finally, giving a voice to the combined manufacturers, manufacturers' associations and the building public. Here, then, we arrive at the crux of the matter, the very first logical movement to further this greater movement. How can the manufacturers' associations, individual manufacturers and the building public uphold their end of the contemplated movement? They have no organization, no plan or method of appointing a committee or committees to serve with the government and the insurance interests in this all-important matter of encouraging fire prevention. Moreover, the first move in this plan must come from the manufacturers of fireproofing materials and protective devices. If they wish to have a voice in the regulation of building conditions, if they feel that they will benefit by bringing about improved building conditions, it is clearly up to them to make the move.

Would it not prove an excellent plan for this disorganized, or rather unorganized, unit to form itself into some semblance of concerted action and enter seriously into the matter of standardization of building construction from the standpoint of fire safety? Surely, the buying and productive power in the field of building construction should have a voice in its regulation. Everywhere the manufacturing interests are working disconcertedly to gain recognition of individual building materials when codes are written or revised. Why not make this a concerted effort to bring about a standard code, or series of codes, in which each material shall have that fair and proper recognition which is consistent with the safety of life and property in its relation to the fire hazard?

In other words, where wood is used indiscriminately and improperly in building construction, let this use be regulated and protection enforced. Let the various fire-resistive and fire-retardent materials be recognized according to their proven properties and given place in the universal building code. Make sensible allowances in the class of construction where efficient fire protective devices are installed.

If every building material and device would assume, or be forced into, its rightful place in building construction; and if a standard building code be used to enforce proper design and insurance engineering, the vast fire waste would be avoided and every interest, with the possible exception of lumber, would benefit. Lumber will always be used in building construction in this country and the national movement should recognize this fact and in every way encourage its use where it can be protected and does not serve to increase the inherent fire hazard. The lumber interests should realize that the market for wood in various forms, such as shingles, and for uses where the presence of wood contributes directly to the fire hazard, is an unnatural market and must some day come to an end. Instead of devoting time and energy to the installation of artificial life into this market, this expenditure should be directed toward the development of a consistent place for wood in the scheme of safe building construction.

A Suggested Organization

It seems entirely proper and profitable to all concerned in the reduction of the fire waste that a strong association be formed whose membership shall consist of manufacturers' associations, individual manufacturers in lines where no association exists, architectural and engineering societies, building officials, contractors, property owners and various movements which tend toward a reduction of the fire waste. This association to have as its purpose a closer knitting of the efforts toward the "common end" and through its power to help further all worthy work in the matter of safer building construction. This organization would give to the producer and consumer a direct voice in the regulation of the use of the materials which they buy and sell.

With this proposed organization the larger work could move on smoothly, with equal representation for all interests and a consequent satisfactory solution of the problem of the national fire waste.

This article, at best, serves only as a sketch and a suggestion. The vast possibilities for good of such a movement cannot well be defined by printer's ink, but if this article may serve in any manner to encourage the birth or growth of a more concerted movement in the matter of fire prevention, if it may even stir up interest and comment and open some eyes to the benefits to be accrued by higher co-operation, its purpose has been well served.

What is "Inspected" Fire Hose?

THE importance of knowledge gained from accurate testing, as opposed to guesswork, has just been illustrated anew at Allentown, Pa. The peculiar circumstances of the case give it a general public interest.

In the month of October, the Copley Cement Manufacturing Company of Allentown had a fire in its stone bunker—presumably from a locomotive spark. The bunker was a slow-burning construction, the fire was quickly discovered and the mill fire squad responded promptly; there should have been little loss.

The fire squad attached a coupling of the plant's expensive new fire hose, ran it to the blaze and turned on the water. The hose burst in five or six places and the fire merely gained headway. The disgusted squad hurried to uncouple the hose and throw in another length, which immediately burst like its predecessor.

By the time a successful stream was finally secured the fire was burning fiercely. The loss amounted to $7000 and was almost entirely due to the hose failure.

Why did the hose burst?

A $7000 blaze is of no great public interest, but the answer to this question concerns everyone.

Note these points: The hose was not old but new. The company had not economized by purchasing cheap hose; on the contrary, it is reported to have taken a special measure of precaution—i. e., had specified and paid for hose inspected by the Underwriters' Laboratories.

It is alleged that the agents of the manufacturers who sold this faulty hose made the false charge that the Underwriters' hose, to a large extent, is a "game of graft on the part of the insurance companies," and naturally discrediting the value of the rigid inspection made by the Underwriters' before a label is permitted to be placed upon fire hose by the Laboratories.

The incident serves to emphasize the need of proper testing to safeguard the life and property and three important points in connection with this fire deserves consideration:

1. The hose in question was not Underwriters' hose. It is reported to have been sold for Underwriters' hose and to have included in the price the Underwriters' charge of one per cent per foot for inspection.

2. Before an Underwriters' label may be attached, each length of mill yard fire hose is tested at the hose factory under three hundred pounds pressure by an inspection of the Laboratories, and must be shown to withstand that pressure test before it may be used. The defective hose at Allentown did not bear this label and is reported to have burst at a pressure much less than the three hundred pounds required.

3. The Laboratories' test is the direct opposite "of a game of graft." It is maintained under the direction of the National Board of Fire Underwriters in the interest of public safety at a large annual expense to the companies. The charges made for inspection are nominal and the work is not intended to and does not produce a profit.

Any product that can comply with the standard of its tests can secure its label, but no product will be labeled under any circumstances until it has withstood the rigid test necessary to prove its worth in time of need.

The lessons of this incident are twofold. In the first place, life and property may be, and often are, sacrificed to imperfect fire hose. In the second place, those who wish the security furnished by fire hose tested and passed by the Underwriters' Laboratories must make sure that each length bears a label certifying to such test. Without such label, any statement by any salesman to the contrary notwithstanding, the hose is not "Underwriters'" hose.

* * *

Uniformity in Sprinklered Risk Inspections

To promote uniform practices among insurance field men of the Middle West, an organization called the Western Association of Sprinkler Inspectors was formed at Chicago a short time ago. Under former conditions property-owners were sometimes seriously annoyed through conflicting demands of the inspectors from different companies and associations, and the need of systematic and uniform practice in the work was made painfully apparent. Through the creation of the new organization the lot of both the assured and the inspector should now be a happier one.

Good Money for Good Photographs

The Portland Cement Association, 111 West Washington street, Chicago, is conducting a photographic competition for the purpose of securing pictures showing the many ways in which concrete has been used.

Cash prizes will be offered for some of the best pictures received, and all others which may be entered in this contest and which prove suitable for use for advertising and booklet illustrating will be purchased at a fair price. Any good picture of concrete work is therefore likely to be worth money to you.

If interested write the above association.

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited by

IRA G. HOAGLAND, Secretary **PAUL MASON, Special Representative**

National Automatic Sprinkler Association

Automatic Sprinklers and Building Construction Problems

AUTOMATIC sprinklers are no longer a purely economic factor, chiefly regarded as of importance in reducing the cost of fire indemnity, but are now recognized, in an ever-increasing degree, as the most perfect safeguards to human life against fire, and therefore are being considered by cities and States from the life standpoint, rather than in their relation to property values.

Protecting Contents

The primary purpose of the automatic sprinkler—the purpose to which it was born and for which it has been developed and to its present near-perfection—is to protect contents rather than to safeguard buildings. Surely there are no more precious contents of a building than the human lives within its walls! As this fact has emphasized itself in the hearts and minds of economists there has developed a very real interest on the part of fire preventionists, city and State officials and numerous civic and industrial bodies in the efficacy of sprinkler protection to life against fire and methods to make this form of protection more efficacious and more generally available. This is discernible in the enactment of compulsory sprinkler ordinances in cities (such as Newark, N. J., and Chicago), State laws (as in Wisconsin) giving to certain officials the power and authority to compel sprinkler installations under certain conditions; court decisions (as in Greater New York) upholding the right of certain officials under general police powers or interpretations of charter provisions, to compel installation of sprinklers, and movements by State officials (as in North Carolina) to remove restrictions on the use of sprinklers or to obtain concessions to encourage their installations, such as free water for private fire service.

These things emphasize a new and keener appreciation of the value of sprinkler protection, especially in its life aspect.

There is another phase, however, that is also receiving much attention, especially from the fire chiefs of the country. This is the possible elimination of the conflagration hazard by more general and systematic sprinklering of cities. This is not to be understood as meaning that sprinklers certainly will stop a conflagration that is fairly under way. That remains to be proved; but it must be conceded, even by the most vigorous opponent of this idea, that a city block in which all the buildings were sprinklered would provide splendid vantage ground—a main trench line—behind which any effcient and properly equipped fire department could reasonably hope to make a successful stand, leading to ultimate control of the conflagration.

What it does mean goes back to the elemental purpose of sprinklers—to discover a fire at the point and time of origin, attack it in its incipiency, and extinguish it before it has opportunity to spread or hold it until the fire department arrives, thus preventing it from becoming a conflagration. Every fire is a potential conflagration, and if sprinklers can be made to catch every fire in a mercantile or manufacturing plant or public building at the beginning it may be claimed with fairness that the probability of a conflagration—if not the possibility—has been eliminated.

Problems of Construction

Problems of construction are a more important factor in the economy of automatic sprinkler installations than they are with respect to their efficiency. It is easier, and costs less, to plan a sprinkler equipment with the planning of a building, and to install it as construction progresses, than to make the plans and install the system in a building already completed—perhaps occupied, and probably built without regard to the necessary sprinkler structural considerations—but no difference in the efficiency of the sprinklers, the efficacy of the protection, is to be expected as the result of these differences in the time and manner of installation. Indeed, an inherent fire trap, completely and properly equipped with sprinklers, thereby becomes measurably safer for its occupants than a fireproof building without sprinkler equipment. In fact, one of the greatest holocausts New York has known was in a building in which every known safeguard of construction and equipment—except sprinklers—had been utilized.

Because it is better to plan a sprinkler equipment with the building and to make the installation as construction progresses, it is desirable to lay down certain rules and regulations for the construction of buildings so equipped in municipal building codes. If those framing the code are far-sighted, practical men, probably it is well to provide for the sprinklering of certain classes of buildings in whole or in part. But it certainly is a moot question as to the desirability of a general compulsory sprinkler ordinance without the flexibility of provision for administrative selection or initiative. Compulsory sprinkler installation may be adversely affected by other things—specifically, charges for water service for private fire protection.

For example, the city of Newark, N. J., has just enacted a sprinkler ordinance as an amendment to the Revised Ordinances of 1913, as follows:

Newark's Sprinkler Ordinance

"Section 231 (a).—1. Every building hereafter erected or altered to be occupied for mercantile, manufacturing or warehouse purposes, covering a lot area greater than twenty-five hundred (2,500) square feet and exceeding three stories in height, shall be protected throughout the entire building with an automatic sprinkler system approved by the Superintendent of Buildings and the Inspector of Combustibles and Fire Risks. Said sprinkler system shall have two sources of water supply, independent of each other, insuring a minimum pressure of twenty-five (25) pounds at all times at the highest sprinkler head.

2. This ordinance shall take effect immediately."

This ordinance was adopted Oct. 6 and approved by Mayor T. L. Raymond Oct. 10. If it can be successfully enforced there is no doubt that—25 or 50 years hence—Newark will be virtually fire safe. But Newark itself has thrown an obstacle in the way of successful enforcement of the ordinance by its imposition of $75 a year for water service—a "readiness-to-serve" charge that really is a "stand-and-deliver" tax, because the city has the power to enforce it. The city has not yet learned that every sprinkler equipment, properly installed and maintained, is an asset far outweighing the addition of $75 a year to the city's funds.

The imposition of the charge and the requirement of installations are diametrically opposed to each other unless they are regarded as jointly forming a revenue measure under which the city seeks to increase its yearly income by penalizing individual efforts for fire control. Under the circumstances, it is to be expected that the enforcement of the ordinance will falter, if it does not fail, or the charge for water service will be abandoned. Both cannot co-exist successfully.

There is, of course, nothing in the ordinance to provide for the safeguarding of existing buildings—unless they undergo extensive alterations. An ordinance, like a statute, cannot be made retroactive. Chicago meets this situation by conferring on the head of the fire-prevention bureau authority to require the sprinklering of existing buildings, or parts of buildings, under certain conditions of hazard, especially to life. This strengthens the code requirements for the sprinklering of certain classes of new buildings, or parts thereof.

New York, operating without a general sprinkler ordinance, finds the authority under which its fire commissioner orders sprinklers installed in existing buildings in a charter provision broadly interpreted. In effect it is an exercise of the police powers of the State, delegated to the city and enforced for the general public weal.

Wisconsin, the only State with a general sprinkler requirement in its State code, carefully avoided making the requirement statutory. It is an administrative function under the statute that makes it possible for the State Industrial Commission to require the installation of sprinklers in any building where they may be deemed necessary.

Variations from Structural Standards

These are some of the general considerations entering into sprinkler protection and its relation to building construction problems. There is, however, a more specific influence, a more intimate relationship; for it is common practice in progressive cities with modern building codes to permit variations from required structural standards where sprinkler systems are installed and where such installations are made coincident with the construction of the building.

Rudolph Miller, chairman of the Building Officials' Conference at its first session in New York, May, 1915, commenting on a statement made by Mr. McKelvey, of St. Louis, that when buildings of the second class (as defined by the code) are fully equipped with sprinklers floor areas cannot be restricted, said:

"I would suggest that allowances or concessions in the requirements for construction be made when automatic sprinklers are installed."

Amplifying his first statement, Mr. McKelvey said (Proceedings, p. 36):

"Suppose a person applies for a permit to erect a building three or more stories in height, to be occupied for manufacturing purposes, and finds that 7,500 square feet is insufficient floor area; in other words, he needs 15,000 or 18,000 square feet. All the applicant has to do is to draw his plans in such a manner as shows a sufficient number of automatic sprinklers are to be installed and that he proposes to otherwise fully comply with the requirements of the building code relating to such enlarged floor space, and I will only too gladly issue to him a permit for the erection of such building.

"Should the applicant refuse to fully comply with these requirements he will be compelled to divide the floor area in such a manner that no part will exceed 7,500 square feet, and this division must be made with a brick wall of standard thickness. Hence, you see that in St. Louis the building code grants considerable concessions where automatic sprinklers are installed in buildings used for certain purposes."

Mr. Miller, touching on the same subject, said that "whether it is a proper subject to be incorporated in a building law is a question not yet solved in New York. We generally consider it a matter for the attention of the fire department." In this connection it is to be noted that reference to almost any (and every) number of the Weekly Bulletin of the New York Board of Standards and Appeals demonstrates that variations from usual building requirements are granted frequently, in consideration of the installation of sprinklers. Thus, the Bulletin of Oct. 5 shows the granting of variations of fire escape requirements for the building at 98 Second avenue, Manhattan, because the structure is fireproof and sprinklered.

These two citations are typical of procedure throughout the country wherever there are sprinkler laws, either State or municipal. The variations apply both to structural requirements, such as areas and enclosures, and regulations for structural equipment, such as fire escapes, wire glass windows, etc. It therefore is of great importance that those formulating building codes or charged with their enforcement should have a clear understanding of the scope of sprinkling equipment, its value in the safeguarding of life as well as the conservation of property, the extent to which it may properly modify otherwise rigid code requirements, and its availability for the prevention of spreading fires by control of conflagration conditions.

An Ark of Safety in a Sea of Flame

THE tremendous value of good construction—concrete and steel, with some wood—adequate water supply and efficient means of protection, skillfully correlated by a disciplined and courageous mill force, is emphasized in the story of a fire that attacked the paper and pulp mills of the Abitibi Power and Paper Company at Iroquois Falls, Ont., during the torrid spell of late summer. This was an incident of the forest fires that swept the Nipissing district of Upper Canada, that devastated 650 square miles of standing timber, destroyed half a dozen villages and many hamlets, and cost between 400 and 500 human lives. The mill buildings, where upward of 2,000 found refuge, might fittingly have been described as "An Ark of Safety in a Sea of Flame."

There have been few recent stories of such dramatic human interest as this story of the great fire—found buried in the "dry-as-dust" details of an insurance inspector's report. Technically, it is a story of sound construction and standard physical equipment, coupled with adequate fire protection, including sprinklers, hydrants and hose; actually, it is a human interest story of skillful fire fighting by a courageous and well disciplined North Woods mill force, ably led. The success of their efforts is found in the saving of upward of 2,000 lives at this one point, which is a story of greater importance than the estimated loss of twenty-score or more; the story of that success is told in the last stand of the mill fire fighters, their final retreat behind the walls of the pulp and paper mills, the knocking off of sprinkler heads to provide water at certain exposed points, the taking advantage of every shift of wind and other favoring factor, and in the long days and nights of ceaseless and vigilant effort, crowned with ultimate and complete success only when the windows of heaven were opened and a downpour of rain reinforced their labors.

Conditions Ripe for a Conflagration

Conditions had been ripe for a conflagration for some time, according to the inspectors for the underwriters that insured the mill. When these conditions became serious, according to their report, the population of Iroquois Falls and many settlers from the surrounding country took refuge in the mill buildings. Many drove their horses into the wet machine rooms, and cows found shelter in the lee of the mill walls. "Undoubtedly the whole population of Iroquois Falls owe their lives to the protection afforded by the mill," say the inspectors.

Walls of the mill are parapeted above the roof; ventilators and most of the bridges are of cement construction; sash are of steel; exposed woodwork is protected by automatic sprinklers, which are also installed throughout all the buildings.

The mill is equipped with extensive waterworks to supply the sprinkler system and the fire hydrants. It was the heroic action of a devoted body of men effectively utilizing this water supply that really saved the mills and their precious content of 2,000 lives.

Near the mills were piles of pulp and a monster heap—24,000 cords—of prepared pulp wood, and on the opposite of the property was the mill's tenement district. All this lay just outside the village of Iroquois Falls. Between the heap of logs and the forest was a half mile of cleared stump land.

For several weeks preceding the fire the weather had been exceptionally hot and dry. The day of the fire the thermometer reached 98 degrees by noon. Numerous small fires had been smoldering and burning in the neighboring woods for some time before the big blaze developed.

During the morning of the fateful day there was little wind until 11 o'clock, when a breeze began to blow from the southwest, constantly increasing in velocity until it became a veritable hurricane.

The First Attack of the Fire

Soon after noon a force of the mill men with hose was ordered into the tenement district, and soon after another force with more hose and wet burlaps went to work to protect the pulp and log piles. The fire from the woods first attacked the tenements, and sparks rained in the mill yard. The machinery was shut down and the entire operating force manned the fire apparatus and made ready to defend the mill.

At 3 o'clock a hot blast of smoke and gas and a shower of burning embers swept over the pulp and log piles and they blazed up immmediately. Six streams of water were shot into the long piles, but so terrific was the heat that the water had no effect, and the men handling the hose lines had to drop them and run to save themselves. The log pile burned like a heap of glowing coal for two days.

Men fighting the flames in the village were forced to fall back and leave the hose. When hope was abandoned the villagers with their animals retreated to the mill.

All preparations that could be thought of were made for the final stand at the mill. Hose was coupled to the hydrants on the roofs; windows and fire doors were closed and guarded; automatic sprinklers were opened to spray water curtains over exposed wood construction.

At 7 o'clock the worst happened. The wind shifted and blew toward the mill the terrific heat of the burning log pile! At 2 o'clock the next morning a heavy rain began to fall and then the danger was over.

As indicating the intensity of the fire is the fact, the inspectors say, that the fire easily crossed the Abitibi River and continued its progress on the other side. And further they say:

"In its destructive effect on property in its path this extensive woods fire may be compared with a city conflagration. The fire was very well fought by the mill people and the fire protection provided worked perfectly, but as far as the defense of outlying property was concerned the fire fighters were simply overwhelmed."

However, the doughty fighters saved an even dozen of outlying wooden buildings on the mill property, and in the village saved two hotels, the store and the railroad station. When the men in the village were driven back from their first position they had to wage a winning fight to keep open their line of final retreat.

This modern industrial plant, constructed to resist fire and equipped to fight fire with automatic sprinklers, hydrants and hose, and above all, with an heroic and skillful body of men—its own fire fighters—trained and disciplined for the effective use of the means provided, thus proved a haven of safety—an ark of true refuge—for a whole community. The story is too dramatic—the lesson too valuable—to remain buried in an insurance report. It is a story for all the world, a lesson that every city—and especially those cities that follow the mistaken policy of putting restrictions around the use of public water supplies for fire protection—and every industry located amid hazardous surroundings, should take deeply to heart, and apply carefully and completely for its own safeguarding.

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A FIRE WITH A MORAL

An Editorial from the Boston Herald

In the threatening blaze on Lancaster street two or three nights ago, the well informed saw not only smoke and flame, but a warning against delay. Automatic sprinklers for the building Commissioner O'Keefe had ordered on the third of last January. Seven months later, in August, the contract for their installation had been signed. And through the delays before and after, the flames beat the sprinklers.

The fire seems to have started in the self-ignition of oily rags—just the danger that the fire department had noted, just the danger against which the safeguard of sprinklers had been ordered.

If you own a risk serious enough to catch the eyes of the fire department and to bring an order for sprinklers from the fire prevention commissioner, you can ill afford to let eight or nine months pass without the protection you need. Meantime if you do procrastinate, what moral right have you to insurance?

INSURANCE DEPARTMENT

Edited by **GEORGE A. WATSON**

Encourage Proper Building Practices

CONTRARY to the belief firmly held in fire insurance circles a generation ago, the underwriter of to-day holds himself morally bound to do all that he can to reduce the annual fire waste of the country, and is giving tangible evidence of the faith that is in him. Because of the nature of his business the underwriter is peculiarly well qualified to note causes that produce fires, both individually and communally, and to suggest means for their removal.

From any up-to-date agent the prospective builder may learn how to erect a structure wherein the fire hazard will be reduced to small dimensions, or if the problem be too serious for the local man, he can speedily put his client and his architect in touch with State or territorial associations, where such information is to be had. The underwriting organizations all maintain engineering staffs, the duties of which consist in scanning plans of architects and engineers, making such suggestions in respect to the fire hazard as will make for the safety of life and property. Confining their work to this particular feature, and having wide experience therein, the insurance engineers become very expert and their advice is of high value. That its worth is recognized is attested by the increasingly large number of prospective and actual property-owners taking advantage of it. Particularly does this apply to those owning or contemplating the ownership of mills and factories of various types.

Insurance men further maintain at heavy cost a city inspection service, the activities of which are confined to investigating the fire hazard of cities and towns throughout the country and making recommmendations concerning building laws, fire protection, water supply and kindred subjects, all bearing upon the broad subject of safety from fire. The work is of great value and has been the means of bringing about reforms that would not otherwise have been attempted.

Still another branch of insurance activity is the issuance by the National Board of Fire Underwriters of model building codes for cities, towns and villages. These suggested regulations are compiled by engineers of eminence and peculiar experience, and are furnished without charge to all properly interested parties.

That the insurance men have a selfish motive in reducing the fire losses of the country does not detract in the slightest from the value of their intelligently directed efforts to that end, which deserve the heartiest support from all interested in the conservation of life and property.

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Building Inspection at Beaufort, S. C.

Among other desirable innovations adopted by Beaufort, S. C., when it passed under the Commission form of government early in 1915, was the ratification and enforcement of a complete building inspection code. By its terms "annual inspection of all buildings, and quarterly inspection of those in the business section is provided for, with a view to cutting down the fire risk. The construction of all building in the city is carefully regulated. Permits for initial construction and repairs are required." During 1915 the total fire loss in the city was less than $500. Those responsible for the new conditions at Beaufort are to be congratulated upon their farsightedness and the thoroughness of their work.

Increased Fire Protection at Atlantic City

The fire protection facilities of Atlantic City, N. J., will be notably increased once the high pressure water mains already arranged for shall have been installed along the beach front. The fire hazard of the famous watering place has always been regarded as serious, owing to the highly combustible character of many of the hotels and their exposure to sweeping winds. The city authorities, however, have taken unusual precautions to guard against the fire menace, and thus far have been fortunate in preventing conflagrations. Steadily, too, the character of the hotels, particularly those located along the ocean front, have improved, not a few of the structures now being looked upon as decidedly fire resistive, if not altogether fireproof.

Fire Hazard of Altoona, Pa.

ALTOONA, a city of some sixty thousand population and situated in the Central-Western section of Pennsylvania, is widely known as a railway center, the Pennsylvania Railroad having important works there. The city was recently inspected by the engineers of the National Board of Fire Underwriters, and from their report numerous improvements in the building regulations and fire-fighting facilities should be adopted to reduce the potential conflagration fire hazard, which is considerable.

The Building Department is under the direction of M. W. Crane, an experienced architect and builder who has held the office for seven years. "Important buildings are inspected frequently, and others at irregular intervals, no regular rule being followed; inspections are also made when irregularities are reported. A systematic annual inspection by wards is made of all buildings within the city for the purpose of ascertaining and causing the removal of hazardous structural conditions."

A summmary of the building laws governing at Altoona is given herewith:

"State laws of 1909 require all open elevators, hoisting shafts, lifts or well holes in use to be provided with automatic trap doors; require standpipes and hose and other fire-fighting equipment on theatre stages, and require external fire escapes on every building more than 2 stories high, or having one or more galleries and used as a public building, non-fireproof office building, institution, sanitarium, asylum, hospital, school, dormitory, theatre, halls or place of public resort; on every factory, workshop or store in which persons are usually exposed above the second floor; on apartments, tenements, lodging or boarding houses or hotels in which persons lodge above the second floor, and on tenements, apartments or flats having two or more families above the first floor. An act of May 20, 1913, requires all exits to fire escapes to have doors of fireproof construction, and all windows opening upon, over or under fire escapes to have metal frames and wired glass."

The present municipal laws of the city were adopted in March, 1913. A digest of those dealing with fire protection is as here given:

"Fireproof construction required for all buildings 5 stories or over in height, but permitting non-fireproof 5-story buildings when protected throughout by a standard system of automatic sprinklers. Detailed requirements are meagre, as no provisions are made for the fireproofing of structural members, 12-inch brick and 8-inch reinforced concrete curtain walls of unrestricted height are permitted and no mention is made of enclosures for vertical openings.

"Mill construction is not provided for. Except as noted any building may be of joisted brick construction.

"Within the fire limits, 2-story frame dwellings may be increased one story, provided building is encased with brick and roof made flat and incombustible. Brick veneered dwellings not exceeding a height of 21 feet, also 1-story office buildings, shops and sheds of similar construction may be erected within said limits. Existing frame dwellings therein may not be repaired if damaged to the extent of 50 per cent of their value, or moved from one lot to another. Roof coverings, cornices, gutters and eaves of incombustible materials are required within the fire limits, but there are no restrictions elsewhere. Every building of two or more stories must have a roof bulkhead with stationary ladder leading thereto; metal frames are specified for skylights, but protection to same are not required.

"Heights are restricted as previously noted and by the general requirements that no building, except towers, steeples and cupolas, may exceed 125 feet in height, but council may by special resolution permit buildings in excess of this height. Areas are unrestricted.

"Wall provisions permit 8-inch terra cotta walls for 1-story buildings and 9-inch walls for 1- and 2-story buildings and also in the upper story of 3-story dwellings, otherwise specified wall thicknesses are mainly satisfactory. Only 4 inches of brickwork is required between the ends of beams entering a wall from opposite sides. Parapets are not mentioned.

"All stores, storehouses, mills and manufactories more than 2 stories in height must have windows which are exposed within 50 feet protected by doors, blinds or shutters of incombustible material; openings on streets are excepted from this provision and prismatic lights in metal frames are deemed equivalent to required protection; fireproof buildings and office buildings are excepted from this requirement. Fire doors are required on both sides of openings in division and party walls; size of openings restricted to 12 by 12 feet. No specifications are provided for the construction or testing of floor beams and columns.

"Floor openings are not mentioned. Requirements for foundations are generally satisfactory, but not sufficiently in detail, as no mention is made of footings or the various types of piles. Fire stops are only required at base and top of partitions in schools, churches and other buildings containing an assembly room. Chimneys with 8-inch brick walls or 4-inch brick walls lined with terra cotta are required; other provisions relating to chimneys, smokepipes and flues, also those relating to steam and hot air pipes, furnaces, etc., are mainly satisfactory and partly in accord with National Board requirements."

Conflagration Hangs Over Providence by a Rotting Fire Alarm Thread

THE danger of a conflagration of unprecedented proportions hangs suspended by a very slender thread over this city, says the Providence (R. I.) "Tribune." This thread is the signal system in the Central Fire Station, which is in "very poor condition," and may fall to pieces or "go back on us at any time," it is stated.

Providence has just purchased eight pieces of motor apparatus for her fire department, including four triple combination pumping engines, at a cost of approximately $65,000.

Yet what would it avail this city if it spends $650,000 for new fire-fighting apparatus, installs that apparatus in the thirty-two fire stations and lets it wait there for an alarm that might never come in?

This is no new discovery, and attention is called to it at this time merely because those whose business it is to keep the signal system in the best possible condition are wondering when, if ever, protective action is to be taken by those responsible for keeping the fire-fighting force and the fire-fighting appliances up to the most modern and efficient standard.

Money Available

At its last session the General Assembly gave legislative authority for the city to hire $150,000 for the purpose of motorizing the fire department apparatus and for otherwise properly equipping the fire department.

And the fire commissioners lost little, if any, time in making application for the purchase of motor apparatus.

As yet no application has been made for authority to expend one nickel of the remaining money, approximately $94,200 (only $55,800 has been spent out of the $150,000), and the firemen, as well as many city councilmen, are wondering why there has been no application for permission to go ahead with plans for making the signal system as nearly perfect as possible, since there was more necessity, according to the agitation of four years ago, for equipping the signal system than for motorizing the fire apparatus.

It will be remembered that in November, 1912, the National Board of Fire Underwriters' committee on fire prevention conducted a thorough investigation here and rendered an exhaustive report severely condemning the signal system of this city.

This signal system was established in 1897 in the City Hall, where fire headquarters were formerly, and was removed to the Three Ones Station in 1904. It was then seven years old, about the age when any up-to-date private corporation (electric light or telephone) would have been planning to supersede it. This system, with but slight replacement expense, has been in use ever since in the new station. It is now 19 years old.

Age Limit Passed

Experts, like Public Service Engineer Robert L. Brunet, say that some States fix the life of a signal system at 17 years, other at 15 years, but few ever go even this limit. Yet Providence has gone 19 years, and there are no signs that it will not go longer, or until the system collapses from senile degeneration; and the fear is expressed that this collapse will come at a time when the city can least afford to see it come; that is, when there is a big fire that prompt signaling would enable the fire department to check, and extinguish promptly and at slight loss.

The National Board of Fire Underwriters, after severely condemning the city's fire signal system in 1912, forwarded a supplement to its "Report No. 217" in April, 1914, in which it declared that "the most urgent of the improvements not yet acted upon are the removal and perfecting of the fire alarm headquarters equipment and the purchase of a fireboat." And also that "the hazardous housing, poor wiring and numerous unsatisfactory details in connection with the fire alarm headquarters present generally unreliable conditions, which justify immediate action; the Board of Fire Commissioners plan to order an investigation by the Superintendent and City Electrician, and from their report make a recommendation for early action to the fire department committee of Council."

Condemn Headquarters Equipment

Of the signal system the report said: "The headquarters equipment is old and some of it is in poor condition and should be replaced by modern equipment, in a fireproof building; this, together with the elimination of all woodwork from the fire alarm rooms, and the installation of every safeguard against possible interruption of service, should be the subject of immediate study and action."

It is recalled that Public Service Engineer Robert L. Brunet and Building Commissioner E. J. Steere reported on the fire alarm telegraph system with recommended changes and repairs on March 31, 1914. This report was in accordance with the Fire Commission's request under date of March 13, 1914, to report defects, if any, and how they might be remedied.

Their report was exhaustive and bore out in every essential particular the findings of the Fire Underwriters' committee.

At that time there were 490 fire alarm boxes in service. Now there are (Jan. 1, 1916) 519, making an additional load on the signal system at headquarters.

Among the recommendations made was this one: "The central fire alarm equipment, although in an operative state, is not in many instances as modern, safe or practicable as present day tendencies or good engineering demands."

Whatever measure of discount one might be inclined to make against the strictures of the fire underwriters, who, quite naturally, want the most perfect fire-fighting facilities in order to decrease their risks, whether they decrease the insurance premiums or not, there is no such reason, nor any good reason at all, for discounting the conclusions of the city's public service engineer, who had no axe to grind and was interested solely in obtaining the best possible system for this city, or in bringing the existing system up to the highest possible standard of efficiency.

Yet nothing, absolutely nothing, has been done about it.

Mr. Brunet Recommended

Mr. Brunet recommended, among other things, the following:

Angle iron or pipe framework supports for the incoming or distributing board in the central station, instead of the wood framework.

New cables or single wires from this board to the central board, with slate panel mounting.

The removal of ali wood framework from the central board.

Thorough repair of the flush protector panels.

That the testing panel be scraped and a new panel installed.

That the manual transmitter, slow and fast repeater relays be mounted on steel pedestals in place of wood pedestals.

That single punch registers be substituted for the 40-pen multiple inking register.

That a metal cabinet replace the wooden racks, with new direct cables.

That fire doors replace the wooden doors on the brick wire shaft in order to effectively and permanently protect the incoming wires and cables from fire hazard.

Complete rewiring of the attic with approved rubber-covered and damp-proof wires.

A slate or metal cover for the top of the brick wire shaft.

"I wish to strongly emphasize the absolute need," said Mr. Brunet, "of repairing, promptly and effectively, the central fire alarm equipment in order that the proper operation of the system may be assured."

With respect to the question of fireproofing the central office and the battery room Mr. Brunet appended a report from Building Commissioner E. J. Steere, in which Mr. Steere advised against making the battery and fire alarm room fireproof, on the ground that the cost would be excessive, and added that if it was deemed necessary to have the batteries and signals in a fireproof room he "would advise that they be housed in a separate building, which should be made absolutely fireproof."

Conditions Worse To-Day

These two reports were made more than two years ago. Conditions to-day are more pressing than they were at that time by at least two years of additional deterioration and depreciation.

But there has been no alarm from headquarters concerning this condition.

When the Fire Commissioners made recommendation last June concerning what use might be made of a part of that $150,000 the city was to hire by the Assembly's authority, they did not mention the menacing condition of the central fire station's signal system.

The Board of Fire Underwriters praised the engines and other apparatus and found them adequate, but severely condemned the signal system. Yet the Fire Commissioners, forgetting this condition, pushed through immediately, or as soon as possible, the contract for motorizing the fire apparatus, though the city was well protected, comparatively, in this respect (see report of the Underwriters' committee), and said absolutely nothing about the signal system which was in "absolute need" of repair two years ago.

Why this hurry about motor apparatus and this delay, or neglect, concerning the signal system, the failure of which would make practically useless the best apparatus in the world?

No Recent Request Made

Superintendent of Fire Alarms Inman, who made a thorough investigation with Mr. Brunet two years ago, says: "The life of your fire department is right here in this central station."

He adds: "The office here should be rewired throughout. The insulation is very much decomposed, played out, gone by, and just like putty on an old window, you can break it off easy.

"We have had no boxes that failed to come in, and have been getting good results so far, but how long this will continue we don't know. Something might happen at any time."

On this point Public Service Engineer Brunet, in an interview yesterday, said he saw no reason for changing his conclusions of two years ago, as conditions are far worse to-day than they were two years ago.

In marked contrast to the indifference of Providence in a matter of such vital concern as an efficient fire alarm service is the present activity of the New York city authorities, who are spending nearly $3,000,000 for a modernized system.

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Portland Cement Association

A Department Devoted to the Use of PORTLAND CEMENT *in Consistent Firesafe Construction*

Special Inquiries regarding the use of cement will be fully answered and any desired information may be obtained by addressing the office of CONSTRVCTION or the Portland Cement Association

The Possibilities of Concrete Construction

IN this department of CONSTRVCTION it is intended to give architects and builders the information now so hard to obtain about the construction of concrete buildings. Wooden buildings differ but little at the present time from wooden buildings used twenty centuries or more ago. The changes in methods of construction are due entirely to the use of power-driven sawing mechinery and finishing machinery.

The average carpenter can put up a building which, when analyzed by an engineer, will be found as suitable for the work it is to do as though the engineer had designed it in accordance with well-known engineering principles. An old, experienced carpenter can tell what size joists to use on most any span and can tell the proper spacing of the joists. Studding are spaced at certain intervals, depending upon the size of the studding and the number of stories in the house. The experienced contractor knows how to use the minimum sizes and the maximum spacing when the owner lays great stress upon the item of first cost.

This assurance of knowledge has come through centuries of practical building experience and the accumulation of traditional methods. With wooden buildings of the warehouse type a considerable change has come about because of the greater use of such buildings at the present time, and the all-important item of fixed charges. A few generations ago carpenters employed on heavy construction had to be trained joiners and a great deal of time was spent in making carefully fitted joints and connections. These joints are now known to be harboring places for organisms that attack wood and cause it to rot and that retain moisture which should not be retained. In the design and construction of such buildings there has been a constant tendency towards simplicity, but the general arrangement of the buildings has been little altered.

Walls of stone masonry have been designed according to rules developed in centuries of practical experience, and all of the fine-spun theories of mathematicians are frequently set at naught because of differences in the retained material that were not anticipated. The walls, however, that are built as thick and heavy as the old rule-of-thumb methods of the practical builder indicates are right until they are torn down to make way for something new. Brick walls are built with thicknesses found by experience to be best. The manufacture of brick is on a more scientific basis than it was formerly. This industry is sharing with all industries in the advance of general knowledge and special scientific training. Attempts have been made at different times to put up lighter brick walls than common experience indicates should be used, and nearly all such experiments meet with disaster. In figuring the thickness of a brick wall the bearing strength alone is not the determining factor. The wall must be thick enough to be stable, which means that it should be rigid and not sway too much when loads are applied to it in an oblique direction. Instances are on record where the sudden expansion of air in burning houses blew out thin brick walls, and this factor has much to do with the fixing of the thickness of brick walls in city building ordinances.

The Value of Disseminating Knowledge

The greatest advances were made possible with the introduction of the printing press and mobile type. Before these wonderful inventions rendered possible a broad dissemination of knowledge each community worked out its own problems without help from the others. Men in all lines of business are always anxious to know what other men in similar lines are doing, and when societies of engineers and architects were organized the flood of papers and opinions poured out into the world led to a very marked approach to uniformity in building construction all over the world. In this way the construction of buildings of wood, stone and brick became standardized.

About the middle of the last century a demand for fireproof buildings set in, and cast iron columns, beams and girders made their appearance. Cast iron for beams and girders was discarded after a few years because it was discovered that when a fire occurred in the contents of a building the iron when heated went suddenly to pieces when the water used for extinguishing the fire struck it. Thereafter rolled wrought iron beams supplanted cast iron. Iron columns have persisted down to the present time, although recognized as not fireproof unless protected with clay or some other non-combustible material. The cast iron column for several years has been going out of use, but to-day many foundries are turning out cast iron columns of a very high grade because, through the printing office, information has been given to manufacturers of cast iron which has revolutionized the industry.

Trade Secrets Valueless

Trade secrets are no longer valued, because every man in business feels that his competitor may have some better ideas and he is willing to make his known in the hope that the other man will do likewise—which he generally does. Rolled steel beams supplanted wrought iron beams about twenty-five years ago, and built-up steel columns have supplanted cast iron columns nearly everywhere, not because they are better in every way but principally because it is much easier to make connections at floor levels when a building of several stories is to be erected. Unprotected cast iron columns will go through fire better than unprotected steel columns, provided they are not struck with a stream of cold water while hot.

Walls of buildings have been made of brick, stone and of wooden studding covered with boards or plaster. Floors have been made with joists of wood or steel, and columns have been made of wood or iron or steel, and many table books contain data which designers use. Men with insufficient engineering training frequently turn out acceptable buildings using the approved and long-used building materials because of the mass of data available.

About fifty years ago reinforced concrete came into being as a real competitor of the older materials, although it has been used in an impracticable way for some years previous. It is now an accepted building material, and everywhere people are taking a great interest in buildings of concrete.

Architects Lack Proper Information

Architects state that there seems to be a strong demand for concrete buildings, and this they cannot fill as they would like because of the lack of information which will enable them to plan and design simple structures in this material with the certainty possible with wood, steel, stone and brick. In the older materials structures are erected with an aggregation of units in certain definite sizes, such, for example, as I-beams of a certain depth and a definite weight per foot of length, wood joists a certain number of inches wide and deep, etc. Safe fibre stresses to use with these materials are accepted by custom or fixed by standard specifications, and the designer really has only to assemble the material into the structures.

With reinforced concrete the designer not only designs every unit that goes into the structure but he also designs the structure. The contractor who erects the structure first makes the material, then makes the units and assembles them. The contractor is, therefore, a nomadic manufacturer and also a fabricator. The fibre stresses used vary with the ideas of the men charged with the preparation of the specifications in various localities. The best opinion of men qualified to be styled as experts has pretty thoroughly settled upon the best stresses to use in the steel and in the concrete when combined together, and pretty definitely settled the manner in which these materials should be combined. This is not known to all architects nor to all contractors, and it has given an opportunity to a great many men to push the sale of special types of reinforcing and special kinds of material.

The Function of this Department

The function of this department in CONSTRVCTION is to get into proper form data by means of which it will be as easy a matter to design concrete structures of moderate size as it is now to design structures of wood or brick, leaving to trained structural engineers the designing of large warehouses and buildings designed for heavy use. Architects are invited to send in questions to the editor, and they will be promptly answered. Contractors and practical builders are given a special invitation to send in inquiries on methods of construction and comments on methods.

The Possibilities of Concrete

The only reason concrete buildings are not more generally seen is due to the fact that this material has not behind it twenty or more centuries of use in a scientific manner. The manifest advantages of this material in many ways and the possibility of erecting buildings of pleasing appearance possessed of a maximum durability and fire safeness promise to bring concrete into as common use as all other materials. It is not a substitute. It is a distinct material, and as such is a competitor on fair terms with the older and better known materials. In deciding upon methods to use in constructing buildings the architect has very little choice when wood or brick is to be used. When he comes to use concrete, however, he finds that he can build walls of solid block or hollow block; one-piece blocks and two-piece blocks; solid concrete walls poured in molds; hollow concrete walls poured in molds; walls made with metal studding covered with metal lath plastered, and walls made of slabs and pillars pre-cast in a factory and assembled on the site. Each method has its advocates and some of the methods are patented.

In the construction of floors the architect has a choice of solid slabs of concrete reinforced with steel; floors made up of concrete ribs spaced on 16-inch centers with tile fillers; floors with ribs on 18 or 24-inch centers with pressed steel fillers and a suspended metal lath ceiling; ribbed floors with gypsum block fillers; and ribbed floors with ribs exposed, resembling in appearance wood joist floors; floors consisting of pressed steel beams carrying a thin reinforced slab on the top, with the ceiling plastered on metal lath on the lower edge; or floors made of pre-cast slabs reston pre-cast beams. Roofs can be constructed in any one of the several ways mentioned for floors, and there is quite as great variety in the methods used for constructing stairways.

Concrete Houses

Each method has earnest advocates, and it is not surprising that the average architect, embarrassed by the claims put forth by salesmen, has not shown a keen interest in preparing plans for fireproof concrete houses. It is precisely this wealth of methods that makes the concrete house a most desirable proposition, and when the architect is sufficiently instructed in the underlying principles and is furnished with a wealth of data to use in design he will discover that there is no more difficulty in properly designing a fireproof concrete house than there is in designing a house of wood or other material. He can, if he wishes, use the concrete only for the framework and floors, and use brick for the exterior walls. The material lends itself readily to treatment, and the fireproof concrete house is already in use to such an extent that the details of ornamental doors, windows, entrances and roofs have received considerable attention in architectural journals.

The Question Department

In this department there will be a combination of textbook matter, descriptive matter and answers to questions. The question department is one that the editors hope to see developed. In the next issue will be taken up a discussion of what concrete is and what it is not, and some tables of slabs with construction details will be presented. It is hoped that a number of inquiries will come in from interested readers in time to be attended to properly by the editors.

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Concrete vs. Frame Construction at Panama

Frame Construction for Temporary Quarters but "Concrete for Permanence"

SOME time ago the lumber journals jubilantly announced that the Federal authorities had discontinued the use of concrete in the building of residences for mechanics and others employed along the line of the Panama Canal, asserting that in future wood only would be employed in such connection; implying clearly that concrete had proven unsatisfactory. The utter falsity of this idea is set forth in the subjoined communication which CONSTRVCTION recently received from the Chief Quartermaster on the Isthmus:

"Frame buildings were used exclusively for employees' quarters during the construction period. A certain number of concrete buildings for employees' quarters have been constructed at Balboa, the first buildings having been completed about two years ago, and construction work is now in progress on five four-family buildings of this type, but no more are contemplated at the present time.

"The principal reason for discontinuing the construction of concrete quarters is that a greater number of quarters can be provided in frame construction for a given amount of money and in much less time than if concrete is used, and it is necessary to have quarters at once for the force now employed, although it is not supposed that this force will be continued more than a few years. Enough concrete quarters have been constructed for what was estimated as the permanent operating force to be stationed at Balboa, and if it is found by the time the frame buildings now in use and being constructed are worn out that more concrete buildings are required for quarters for the operating force it is probable that they will be rebuilt to replace the frame buildings.

"Frame buildings and concrete buildings are equally suitable for use as employee's quarters on the Isthmus, so far as climatic conditions are concerned."

"Fundamentals of Reinforced Concrete Design"

A lecture prepared by Ernest McCullough, Chief Engineer, Fireproof Construction Bureau, Portland Cement Association, for the Short Course for Manual Training and Vocational Teachers, held at Lewis Institute, Chicago, June 26 to July 1, 1916.

This lecture has been published in booklet form and may be obtained by addressing the association at Chicago.

"Concreting in Cold Weather"

"By observing some simple and easily-applied rules for preparing concrete mixtures, then using a few simple means to protect the freshly-placed concrete, the resulting work will be just as successful as though carried on during warmer weather."

Rules and proper practice are carefully outlined in this booklet, which may be obtained by addressing the Portland Cement Association, Chicago.

Fire Prevention and Over-Insurance

By F. H. Hardison, *Insurance Commissioner of Massachusetts*

From an address delivered before the Insurance Society of New York

HERE is another problem: Fire from causes easily seen and removed should be followed by the punishment of the one responsible for it. The paying for losses from fires caused by carelessness, by slackness in allowing conditions to exist that breed fires, by building structures which invite fires, by carrying on processes in inflammable buildings that create fires, are all prolific sources of fires. The furnishing of insurance in such cases is one agency which causes such conditions to continue. A, who is naturally a careful, systematic individual, but a shrewd business man, says in effect to himself:

"There is my competitor B, who spends nothing for keeping inflammable rubbish, which invites fires, cleared away, introduces no fire-prevention measures, yet collects for his losses without loss of prestige. Why should I pay for his carelessness, his failure to take steps to prevent fires, while at the same time I am using my time and money to save him as well as myself from cost from fires on my premises? Until all engage in the work of fire prevention, why should I spend my money in that direction and still help pay the losses of those who do nothing?"

This is not entirely an unreal situation, and it must be admitted that the insurance given to B is not in the interest of fire prevention. In the interest of the elimination of this fire waste, the old, old question which is still with us demands attention: Under what conditions should fire insurance be provided, and to whom?

The old Adams arithmetic, which I used when a boy in a little red schoolhouse in New Hampshire, said, as I well remember, that fire insurance policies are not issued for more than three-fourths of the property value, "lest it be fraudulently destroyed."

We have left some distance behind that view in this era of myriads of agents, who do the underwriting on a commission basis and generally, without an appraisal, put all the insurance on the property that the owner asks for, while complaisant and indulgent company officials, mayhap several days' journey from the risk, let it stand as written, ignorant of the values, but knowing that if a fire occurs they have agreed to indemnify the insured only for the amount of the loss, no matter how large the policy; and knowing that if no fire occurs—and the chances are much more than even that none will occur—the property-owner has been punished for his grasping at excessive protection by paying a higher premium than he would have paid for the amount of insurance he should have carried. The amount of money paid for over-insurance—meaning by "over-insurance" what is written in the policy in excess of the indemnity that would be paid in case of total loss—the amount of money paid in this country for such over-insurance cannot be known with exactness, but it doubtless runs up into the millions; a prize that continuously stands as a barrier to the best results to the public in the use of fire insurance.

Hence here is another unsolved problem, which, stated more correctly, is to stop over-insurance through careless, grasping or unprincipled agents, and to establish a constant, persistent, ever-in-sight-and-never-silent incentive for the insurer to prevent fires. May not contingency commissions act as a corrective to the agent, and a policy that requires the insured to bear a fixed proportion of a loss before he gets anything from the company, if the fire originated on his premises, tend to keep the pocket-nerve sufficiently irritated and alert to cause the careless property-owner to reform, and the expert salesman who would "sell his property to insurance companies," with the assistance of a timely fire, be hampered in getting his profit on his "sale"?

Various remedies have been suggested for discouraging fires besides the one mentioned in my old arithmetic, to which I have alluded. A report of the Massachusetts Insurance Department, issued more than fifty years ago, or to be exact in 1862, had this to say:

"Among us there is need of laws more effectually to control the manufacture, sale and use of fireworks, not excluding that omnipresent little pyrotechnic, the friction match—a thing which sometimes seems to fulfill its destiny without friction. In France, which understands chemistry, the amorphous or uncertain kind of phosphorus is not permitted to be used in the manufacture of lucifers. If patriotism does not consist in burning up our country, it seems to us that the whole trade in Chinese fireworks should be prohibited, and amusements should be provided for our children which will not tend so strongly to take the roofs from over their heads.

Over fifty years have passed since the above was written, but friction matches are to-day more omnipresent, if anything, than then; people are quite as careless in their use and no more concerned as to who are injured thereby. Fireworks burn up fortunes every year, and the insurance companies pay the bills; that is, are popularly supposed to do so, else the public would not submit to it long. If there were no full insurance, would this menace continue? Rather, would it not be swept away at once? Yet, as the money to pay for such losses is collected under the guise of "insurance premiums," instead of an assessment for Fourth of July fun and careless habits, it is lost sight of, but just the same, the tax for that fun and that carelessness is in the premium.

LEGAL DEPARTMENT

Edited by **WILLIAM LAW BOWMAN, C.E., LLB.**

Arbitration Suggestions

WHILE a legal fight for principle is at times necessary, yet the ordinary business man is very chary of wasting his time in law suits. The considerations of time, the law's delays and expense have been the reasons which have taken out of the busy man's pocket many thousands of dollars. In other words, expediency has seemed to demand settlement and compromise at great loss rather than litigation. To reduce the losses so caused it has became a widespread practice in most contracts to provide for arbitration in the hope that, should differences occur, they might be settled in that way speedily, equitably and with a minimum of expense. However, those who have experience with the usual arbitration contract clause know that it has not accomplished the desired result.

Defects of the Average Uniform Contract

Take for example the so-called uniform contract in constant use at the present time by contractors in their struction work. The provision there specifies that in case the parties fail to agree in certain matters, then the same shall be referred to a board of arbitration, to consist of one person selected by one party and one person selected by the other party, these two to select a third. It is usual to provide also that the decision of any two of this board shall be final and binding on both parties, and that each shall pay one-half the expense of the reference.

While it must be admitted that where the differences are slight, or the money involved small in amount, both parties may carry out the provisions of such a clause, yet ordinarily, if there is very much at stake, it has been found that one or another of the contracting parties will refuse to appoint his arbitrator or, if he does appoint an arbitrator, that arbitrator will refuse to join with the other arbitrator in selecting a third. These instances are so typical that you often hear it expressed "that the ordinary arbitration clause is not worth the paper it is written on." The chief reasons for this statement are, first, because courts of equity have very generally refused to decree specific performance of agreements to submit to arbitration when expressed in the usual wording stated above; and, second, because, although an action at law would doubtless lie after a breach of such a covenant in a contract, yet the impossibility of proving damages causes that remedy to be useless.

Those who have tried to secure an arbitration award under such a contract clause have also learned to their sorrow that even if they are able to get an arbitration board satisfactory to both parties and chosen in the method specified, their troubles are only commenced. If the arbitrators are the kind to whom an important matter would be submitted, they are busy men, and it is extremely hard work to get a meeting of such a board. The method of procedure before such boards is usually new to the parties, and unless they both employ attorneys, which, of course, increases the expense, there are difficulties in getting the evidence before the board and in putting in the case. Then again, it usually happens that the arbitrator picked by each party tries to support the contentions of the man who appointed him, so that when the time comes for a decision it often depends solely upon the third party chosen by the two original arbitrators.

Blocking the Arbitration

It has been discovered that unless such an arbitration which has been undertaken pursuant to a contract clause is also agreed to be had pursuant to the arbitration laws of some State, a party who finds the matter is going against him will refuse to continue the arbitration or refuse to put in his evidence, thus blocking and stopping the entire matter. As there is no adequate legal remedy for such action, provided it is taken by the party before the award is finally made by the board of arbitration, one can realize the feelings of the injured party. As a practical matter, therefore, it is safe to say that an arbitration under unfavorable circumstances is a snare and a delusion.

Although the courts are generally jealous of their prerogatives, because they feel that they have better provisions for securing justice than are possessed by arbitrators, yet the legislatures of many States have realized the importance of arbitration and passed laws respecting them. In those instances, however, they specify what kind of person is capable of entering into such a settlement and what character of disputes may or may not be submitted. It is usual to specify provisions respecting the appointment of one or more arbitrators, how they shall be appointed, how hear the testimony, how make their award, etc. As a result, in order for the successful party to be assured of collecting his award, he must employ legal counsel to direct him, otherwise the arbitrator of the board of arbitrators, if laymen, should have legal counsel.

An Interesting Example

A very interesting phase of such an arbitration has been brought to the author's attention. An owner and a contractor, pursuant to the usual arbitration clause, selected arbitrators who joined in picking a third. The owner was an attorney.

As the arbitration was to be held in accordance with the Code of Civil Procedure of the State of New York, the contractor submitted an agreement respecting the arbitration to the owner, specifying especially the matters which the arbitrators were to pass upon. The owner took exception to the wording, so that finally the contractor thought that he had agreed with the owner that the arbitrators might pass upon any matters which either of them should care to present respecting the construction work. An agreement was signed which was supposed to cover this understanding, and the arbitrators commenced to take testimony. None of the arbitrators were attorneys, and they suggested that no attorneys appear before them for either party, which was agreed to. At the first hearing the contractor presented such a different case from the expectations of the owner, and his evidence was so overwhelming as to the owner's defaults and the defaults of his architect that the lawyer-owner immediately began to use legal technicalities to evade the issue and demanded that the arbitration be restricted to one or two small items which had been the chiefly discussed matters between the parties. In his demand that the arbitrators so restrict the arbitration, notice was given that if they did not do so an appeal would be taken from their decision, the arbitration agreement having provided for the judgment to be entered in the Supreme Court upon the award. In other words, the contractor faced the prospect of having a court proceeding after he got an award of the arbitrators.

A Better Provision for Arbitration

In at least one respect, however, parties are now able under the law to better provide for an arbitration which will hold and which, if carried out, will save considerable time and expense. That result is accomplished by naming in the contract a specified person who shall act as arbitrator. For example, if in a building contract it is stated that all controversies shall be referred to the "Legal Editor" of a reputable publication or the "President" of some well-known engineering society, or, of course, naming a particular person, then it has been held that such arbitration clause is binding and that one party cannot sue the other until and unless the matter has been referred to the arbitrator named and he has refused to act or has made his award. In this way one of the chief objections to meet arbitration clauses is overcome and neither party to the contract can get out of it, as has been the practice in the past. As stated before, it has been found that ordinarily the arbitrator appointed by each party considers himself a partisan and that he must help the party who appointed him, so that the decision is ordinarily made by the third party; hence, if the third arbitrator, or such a person as he would be, is named originally in the contract, the result reached is the same in any case and you are rid of the expense of two unnecessary arbitrators. The naming of a single person usually will eliminate the delays which are caused when a board has to meet. If the person who is selected as arbitrator has had experience in that class of work, he will have formed his own ideas as to the way in which he desires the testimony and exhibits presented, and he can specify his requirements so clearly that they can be carried out by the respective parties without legal assistance. In this way, in many instances, you can eliminate the expense of legal counsel.

No Ground for Appeal

Without any statement in an arbitration agreement, it is of course expected that an arbitrator will decide the matter submitted to him in accordance with the law applicable. So many laymen have the idea that at times our laws or the decisions thereunder are unjust that in many arbitrations it is provided that the arbitrators shall make their award based upon their personal opinions as to the right or justice of the case and not strictly in accordance with the law. Naturally, if such powers are given to the arbitrators in a case where it is provided that a judgment may be entered in some court of record, it is worthy of note that an appeal from such an award or judgment could not be based upon the ground that the decision was contrary

Any question in regard to the law as affecting the interests of architects, contractors, manufacturers or property owners will be carefully answered in this department.

to the rules of law and decisions of that jurisdiction.

In conclusion, and as a summing up of the suggestions, it is recommended:

First, that where contracting parties honestly and seriously desire arbitration to settle their differences, that a single arbitrator be named in the original contract, preferably one who has had experience or who is making a business of such work.

Second, an arbitration agreement should be drawn specifying the exact matters upon which the arbitrator is to pass, and that the arbitration is held pursuant to the State laws respecting the same, providing there are such laws.

Third, the arbitration agreement should provide whether or not the arbitrator is to act strictly in accordance with the law applicable to the case, or to decide upon grounds of equity and justice irrespective of the law.

Experience has shown that under such circumstances the high hopes for arbitration may be realized, thus eliminating legal controversies, with their waste of time, delay and expense.

Official Arbitration

(From "Contracting," October, 1916)

THE American Society of Engineering Contractors is to be congratulated on the recent action of its board of directors in appointing W. L. Bowman, C.E., L.L.B., as the general counsel for the society, and especially for its official recommendation that future construction contracts designate Mr. Bowman as arbitrator for any disputed point.

The society is fortunate in securing an attorney, author and engineer so conspicuously qualified for this judicial service. His personal and professional character and attainments should commend him equally to both parties of engineering contracts and go far towards the acceptance of a single authoritative arbitrator who will have no difficulty in exercising implicit impartiality, rather than a trio of representatives, two at least of whom are naturally disposed to be more sympathetic towards their sponsors, a condition that often results in unnecessary controversy, partisan efforts, and compromises that may eventually give the third arbitrator the final power of decision, thus reducing the system to exactly the same terms as are more directly and simply obtained by appointing a single arbitrator at first.

As most contract disputes are primarily due either to ambiguous specifications, unfair contracts, misunderstandings, or to the lack of necessary data or its improper representation, the work of the arbitrator is largely that of studying, digesting and analyzing recorded data and equities and making his decision on the merits of the case, with due regard to governing conditions and established practice. These considerations become matters of fact that should not be subjected to barter or compromise. Arbitrators, then, require first a wide experience in both the theoretical and practical sides of the class of work involved, a thorough and conscientious study of the facts in the case, ability to analyze and digest it, and to arrive at clear and impartial conclusions.

These qualifications can be perfected only by years of experience and responsible work. It therefore follows that continuous service in this official capacity will greatly develop the ability of the arbitrator and correspondingly benefit his clients, thus being obviously more advantageous than the appointment of a new man for each case. Mr. Bowman will not only be able to devote his large expert knowledge to these duties, but will be in position to command the best specialist services for advice, conference and co-operation.

New York's Safety Congress

Attention is called to the next New York State Safety Congress, which is to be held in the ballroom of the Hotel Onondaga, in Syracuse, on Monday, Tuesday, Wednesday and Thursday, Dec. 11 to 14, 1916.

At this congress "Industrial Safety" will be the slogan. Addresses will be delivered by experts in all the factors which enter into industrial safety. After each address the congress will resolve itself into a debating school for a thorough discussion of the subject matter involved. Illustrated lectures will be given.

The great importance of industrial safety to employers, employes and the public at large should insure a large attendance at this Safety Congress called by the State Industrial Commission, the governmental agency charged with enforcement of the laws dealing with this phase of industrial energy.

Just mark Dec. 12, 13 and 14 at Syracuse in red ink in your memorandum book. Come yourself and bring your superintendent and factory foremen. If you cannot come yourself, send your superintendent and factory foremen, that they may profit by the educational features of the congress.

Severe Arraignment of Wood Shingle Roofs*

By I. W. Haney, Chief Fire Department, Jacksonville, Fla.

Experience of Paris, Nashville and Other Southern Cities with Combustible Roofing Material Vividly Recalled to Fire Chiefs

AT the annual meeting of your board of directors there was assigned to me the subject, "Does the Menace of the Wood Shingle Justify Its Abolition?" It was little any of us then present realized that before my paper should be presented the most disastrous results that have yet been known on the American continent, due to this cause, would have been impressively brought to your attention. I refer, needless to say, to the sweeping conflagrations that occurred last spring in such rapid succession at Paris, Tex.; Nashville, Tenn., and Augusta, Ga.—conflagrations that occurred within such short intervals as to stagger the country and entail a total loss of some eighteen million dollars.

As insurance engineers were promptly on the ground and made a thorough and intelligent study of the causes and effects of these fires, with a view to drawing from them at least some lessons for future guidand and avoidance, the information given out as to the prominent part played by shingle roofs in spreading these fires until they reached the magnitude of conflagrations is not a matter of peradventure or guesswork, but comes to us as a statement of engineering facts.

Destruction Swift and Complete

Turning to the Paris, Tex., fire, we find the following statements from the State Fire Marshal:

> The swiftness and completeness of the destruction in Paris is probably without parallel in the State and, in some respects, not in the nation. The destruction is greater in its completeness and burned area than that of the Baltimore conflagration, in proportion to population. * * * A most important lesson to be drawn is the hazard of the shingle roof. Modern history does not contain a more perfect example of the conflagration hazard that is present in every city or town where the shingle roof is prevalent. The burning of the business district of Paris was not due to lack of fire fighters; it was not due to the lack of water; it was not due to the construction of the business district itself, but was primarily attributable to the shingle roofs of the residence section of the city.

I would especially call your attention to the statistical information that "of the buildings shown on the Sanborn Map of Paris, 1,440 were destroyed, and of these 1,051, or 73 per cent, had combustible roofs," and to the engineers' recapitulation: "Fire started in rather small area frame warehouse. Spread is directly due to shingle roofs aggravated by high wind, velocity of which is possibly overestimated."

Next let us consider the Nashville report, these excerpts taken from the report of the Tennessee Inspection Bureau, whose head office happened to be located in Nashville, so the officials were immediately on the ground and had every opportunity to study this fire from its inception.

From this report we read:

> On account of the high wind blowing the fire spread with remarkable speed. The demonstration of the mistake of covering any kind of building with combustible shingle roof was even more remarkable. A wide open space separated the point where the fire started from the rest of this section of the city. Burning brands from the thirty-three buildings burning, but apparently under control when this space was reached, were carried diagonally across it, first in a generally easterly direction, a distance of 1,800 feet, and next in a southeast direction a lesser distance. Two secondary distinct conflagrations were then started across this clear space. It is not proper to lay too much stress on the high wind blowing at the time of the fire. This undoubtedly had much to do with its severity and rapid spread, but it is idle to suppose that burning brands after traveling 1,800 feet would be deposited in such quantities as to be uncontrollable had fire-resisting roofs been encountered. It is likewise a matter of record that burning brands have transported this distance from smaller fires with very light breezes blowing. This fire demonstrated not only the ready combustibility of the wood shingle, but also the readiness with which it lends itself to the formation of flying brands.

Under recapitulation we find: "Spread is directly due to shingle roofs, helped by very high winds."

The last paragraph of the report is of especial interest:

> Major portion of the fire occurred in a section of the city where new installation of shingle roofs are prohibited, but a number of such roofs were still in evidence, and by the time fire reached this section the class of roof used had ceased to be a factor, thus illustrating the weakness of any partial restriction of this kind.

And finally I quote from the report of the South-Eastern Underwriters on the Augusta, Ga., conflagration:

> The first building on the south side of Broad street to catch on fire was a frame shingle roof building near

(*Continued on page 306*)

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* Address delivered before the latest gathering of the International Association of Fire Engineers.

Edited by
SAMUEL GEORGE WEBB, C.E.
Secretary
Gypsum Industries Association

A Department Devoted to the Use of
GYPSUM
In Consistent Firesafe Construction

Special inquiries regarding the use of Gypsum will be fully answered and any desired information may be obtained by addressing the Office of Construction

The Properties and Uses of Gypsum in Fireproofing

IN commencing the new Gypsum Department in this issue and in this first section the writer believes that it would be appropriate to say a little about the occurrence, the composition, the manufacture and the various uses of gypsum.

Gypsum is one of the oldest known building materials and is found to-day as the plastering material on the interior walls of the rooms in the tombs of the Califs of Egypt, placed there when these were erected over 4,000 years ago. Mural decorations were placed upon the gypsum surfaces of the rooms and is found to-day in excellent state of preservation. In the Pyramids of Egypt the plastering material covering the wall surfaces of the interior chambers is solid to-day, which is an excellent evidence of the unending durability of gypsum.

"Gypsum" is the geological name for hydrated sulphate of lime with, in the pure state, a chemical formula of $CaSO_4\ 2H_2O$. This formula means that pure gypsum contains 32.5 per cent lime (CaO), 46.6 per cent sulphus trioxide (SO_3), 20.9 per cent water (H_2O).

It is seldom, however, that mineral gypsum is found absolutely pure in nature and usually contains some small proportion of impurities, such as clay, limestone, silica, etc.

Gypsum is found in many countries and has been known and used in these countries for hundreds of years, namely, England, Italy, Switzerland, Sicily, etc., and is very liberally distributed in the United States and Canada.

We are familiar with the term "Plaster of Paris," which is calcined gypsum, and received this name because gypsum is found and mined in large quantities in the Paris basin in France. It has been known by this name in Europe since the thirteenth century.

The lavish distribution of gypsum over the earth's surface occurs principally as a soft rock, which is either in the form of veins below the ground or in large masses near the earth's surface, covered by only thin layers of soil.

Gypsum in the United States

In the United States gypsum is found in 23 States, including Alaska. The total amount mined in these States during 1914 was 2,476,465 tons. All of this, with the exception of 443,687 tons, was calcined and manufactured into gypsum plaster or gypsum structural materials. The uncalcined portion was used in Portland cement manufacture, in paint manufacture and as land plaster.

In the production of gypsum New York State stood first, Iowa ranking second and Michigan third.

In addition to the gypsum produced in the United States a considerable tonnage was mined in Nova Scotia, New Brunswick and Newfoundland and shipped to calcining mills located on the Atlantic seaboard at New York, Newark, N. J., Newburgh, N. Y., and Chester, Pa. The quantity so imported from Canadian points in the year of 1914 was 369,214 tons, making a total of material manufactured and used in the United States in the year of 1914 of 2,284,970 tons.

Calcining the Gypsum

The gypsum to be converted into plaster and manufactured into such articles as gypsum block, gypsum board, etc., has to be calcined into plaster of Paris. This is effected by crushing the gypsum rock and then grinding it to a very fine powder and placing this powder in what are known as "kettles" and subjecting the material in these kettles to external heat. In this way some of the water of hydration is liberated, which is approximately about 14 per cent, leaving about 7 per cent of water of crystallization still remaining in the material. The gypsum thus converted into plaster of Paris, or calcined gypsum, is mixed in mixing mills with ingredients such as wood fibre, sand, hair, retarder, asbestos, or combinations of these materials, to form wall plaster. In the case of neat gypsum wall plaster the sand is omitted. Such plaster is known as neat gypsum plaster, and when the plasters are manufactured ready for use they are known as ready-mixed gypsum wall plasters.

It may be well to consider the qualifications that gypsum wall plasters possess, which have been responsible for the very great and rapid growth of the use of "hard wall plasters," or in other words and more correctly, gypsum plasters. This growth is illustrated by the fact that the gypsum mined in the United States has grown from 90,000 tons in the year 1880 to 2,476,465 tons in the year 1914. Gypsum plasters must therefore possess distinctive merits to bring about such a wonderful increase in their use.

Qualifications of Gypsum Plasters

Some of the qualifications of gypsum plasters, not necessarily in the order of their importance, are as follows:

First—Hardness. Calcined gypsum, or "plaster of Paris," as it is popularly known, resumes the form of gypsum or hydrated sulphate of lime when water is added to it. It then "sets" or becomes hard by taking up the required amount of water to become fully hydrated and is so hard that it will withstand a breaking pull of 100 or more pounds per square inch. This qualification of hardness acts as a valuable means of stiffening or strengthening the building on the walls of which it is used.

Second—Sanitation. Gypsum plaster is sanitary because of its very hardness. This hardness exists throughout the entire mass of the plaster, as the "setting" of the plaster occurs throughout the entire mass. This gives a wall surface in which injurious disease germs or objectionable insects cannot find lodgment, and it also offers an impediment through which larger vermin find it impossible to make holes.

Third—Durability. We have already noticed the fact that gypsum plaster becomes hard by the "setting" or the taking up of water of crystallization, and in this way becomes a fixed chemical body, namely, hydrated sulphate of lime, or gypsum. We have also seen that gypsum is found to-day in the form of the plaster covering of many of the walls of the chambers in the Pyramids of Egypt, and that it has been there for upwards of 4,000 years.

In the city of Paris, France, gypsum is found in large quantities and has been calcined and used under the name of "plaster of Paris" for plastering and structural purposes for hundreds of years.

The mere recital of the above facts shows that the durability of gypsum wall plasters is very great and that the use of gypsum wall plasters means that wear and tear in a building is resisted effectively.

Fourth—Quick Setting and Quick Drying. Gypsum wall plasters can be used during any time of the year and will "set" and become hard and dry out so quickly that the owner is enabled to have the use of his building in the least possible time. He can also proceed with his painting and place his decorations over the gypsum surfaces with very little, if any, misgiving that such decorations or painting will be injured by too early application.

Fifth—Convenience in Handling. Gypsum plasters are usually marketed packed in bags in the ready-mixed form and necessitate only being mixed with water at the building. This enables the user to handle gypsum plaster in convenient packages only in the exact amount of material that he requires and in a minimum space in the building. This great convenience in handling and using gypsum wall plasters has been a considerable factor in their popularity.

This is only a brief outline of some of the principal advantageous qualifications which gypsum wall plasters possess and about which there is no real dispute.

Structural Forms of Gypsum

Gypsum possesses certain well recognized physical characteristics, and perhaps the chief of such characteristics which has brought about a very extensive use of gypsum in structural forms is its great resistance to heat and, by the same token, its high value as a nonconductor of heat.

The reason for this qualification is very simple.

We have seen that gypsum is a hydrated sulphate of lime and that the water of crystallization can be liberated by the application of heat.

When heat is applied to gypsum the heat units immediately start the work of liberating the water of crystallization in the gypsum, and in this work the heat units are absorbed so that the sensible heat does not rise above the temperature required to start this crystallization, namely, about 230 degrees F. All additional heat units applied are "latent" and are used in the work of liberating the water of crystallization. This temperature does not increase until all of the water of crystallization is liberated. Again the water of crystallization as it is liberated has to find an outlet towards the heat and further impedes the work and the progress of the heat into the mass.

This is, briefly stated, the reason why gypsum is a poor conductor of heat or is a good non-conductor of heat and why it also offers a wonderful resistance to high temperatures.

Still another qualification which gypsum possesses is its poor conductivity of sound, or, in other words, it is a good non-conductor of sound. The reason for this is its comparatively soft texture, and offers a very poor medium for the transference of sound waves through itself.

The possession of these two qualifications by gypsum has been responsible for a very great development in the use of gypsum materials for structural purposes.

Gypsum Blocks.—One of the best known forms in which gypsum is used structurally is in the form of gypsum blocks. These are building units manufactured at the factory, and are either hollow or solid, generally the former, and are built up into walls, gypsum mortar being used for bonding at the joints. Such walls are used principally for partitions in the highest class of buildings, and such partitions are classed as "fireproof." These partitions are used for practically all of the purposes for which partitions are required, namely, enclosures of elevators and stairways, corridor partitions, fireproof dividing partitions, protection of steel columns, etc.

A great development has taken place in the use of gypsum blocks of large dimensions, reinforced on the under side, for filling in between the steel purlins of roofs, after which the finished roof is placed on the top surface of the "roof deck" so constructed.

"Poured" Floor and Roof Construction.—Still another use for gypsum in structural forms is in the "poured" form for structural floor construction and for roof slabs between steel frame work.

The qualification of non-conduction of heat is an important factor in the use of gypsum either in the block form or in the "poured" form for roof construction, as in a great many cases, particularly in factories, it is highly important that the roof construction shall be a good non-conductor of heat. In cotton mill construction, for example, it becomes a very serious thing indeed if condensed moisture accumulates on the under side of the roof slab and drops on the cloth, in which case there is a considerable money loss. It has been found by tests that two inches of thickness of such gypsum material is about equivalent in non-conducting value to one inch in thickness of pressed cork of the best quality.

In floor construction gypsum in the form of a special dome tile is used extensively as "filler blocks" between reinforced girders to form a "composition" floor with a flat unbroken under side.

Gypsum Plaster Boards.—Gypsum is largely used as the principal component part of gypsum plaster boards. These plaster boards are used in a variety of ways, the principal use being as an incombustible lathing material to be attached directly to the wood or metal studding and plastered over with gypsum plaster.

Gypsum plaster boards are of three principal types:

1. Molded plaster boards with fibre reinforcement.
2. Plaster board with both outside surfaces of wool felt.
3. Plaster boards of laminated construction with alternate layers of wool felt and gypsum.

They are usually made in large units, such as 32 inches by 36 inches, or even larger.

For further information regarding gypsum plaster boards the reader is referred to an excellent illustrated article entitled "Incombustible Lathing Materials," by Virgil G. Marini, Mem. Am. Soc. C. E., which appeared in the September, 1916, issue of CONSTRVCTION.

Uncalcined Gypsum

Gypsum in the uncalcined form is used extensively in agriculture as land plaster. Land plaster is gypsum as found in nature, merely crushed and ground into a coarse powder. It is spread over the land and has both a direct and indirect food value, the indirect value being its ability to unlock other plant foods, such as nitrogen and potash, and make these available for the plants.

Gypsum in the crushed form is extensively used in the manufacture of Portland cement. In this use it is mixed with the Portland cement clinker and ground with it in certain small proportions for the purpose of regulating the time of setting of the Portland cement.

There are many other uses for gypsum in either the calcined or uncalcined form.

As calcined gypsum or plaster of Paris it is extensively used for molds in pottery manufacture.

In the finely powdered condition and uncalclined it is used extensively in paper manufacture.

In the future sections devoted to gypsum in CONSTRVCTION it is intended to present to the readers interesting items and illustrations dealing with the many phases of this interesting material.

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Sawdust an Efficient Fire Extinguisher

THE value of sawdust as a cheap and efficient fire extinguisher should be of interest to many.

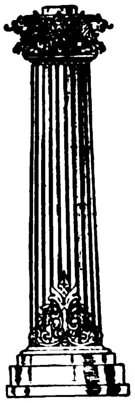
Sawdust of any kind may be used, provided it is not too fine, and it has particular value in extinguishing incipient fires in oils and inflammable liquids. Light oils, when spilled on the floor and set afire, or fires in tanks containing heavier oils, may be extinguished quickly by spreading sawdust rapidly over the surface to exclude oxygen.

Added value may be given to the sawdust extinguisher by adding to it bicarbonate of soda, which will give off carbon dioxide gas and blanket the flames.

Editorial—

Science and Selection in Firesafe Building Construction

A Discussion of the New Editorial Departments and Their Value to Our Readers



COMMENCING with the present issue of CONSTRVCTION, an extremely valuable addition has been made to the editorial pages by the opening of special departments, covering the uses of various materials and devices which might well be termed the basic elements of firesafe construction and the protection of building contents.

There can be no doubt of the value of such departments to the readers of this publication, particularly in view of the fact that they are edited by experts in charge of associations of the leading manufacturers in the various branches of the fireproofing industry. Those who edit these various departments are men chosen for their knowledge and experience in each particular line, whose business it is to study the properties and uses of the materials which each represents, and to properly disseminate such information for the benefit of the building fraternity.

From the standpoint of firesafe construction, the building fraternity might be said to comprise architects, contractors, fire insurance interests, building officials and prospective builders.

The science of insurance engineering, or the provision of safety against fire, is more and more appealing to the architect; particularly is this true in sections where building regulations are not of a strict nature and have not enforced a careful study of this subject. Here, in the special departments of CONSTRVCTION, any and every question in relation to the materials and devices which can be employed to lessen the fire hazard, will be cheerfully answered. Here is opened for the architect a veritable fireproofing school, an unequaled opportunity to do justice to clients and to build for business success. Let each architect ask himself frankly as to his *real* knowledge of *consistent* firesafe construction. What of modern comparative costs of building materials? Is concrete or brick construction actually as cheap as wood? Will gypsum partitions *really withstand flame?* What are the newest economical forms of unburnable construction?

Contractors will learn many interesting facts from these pages, and may learn more by asking questions. The money-saving methods of erecting various types of masonry construction and other every-day problems may find easy solution by taking advantage of the knowledge and experience of others.

Those engaged in the business of fire insurance should always be interested in the lessening of the fire losses in the practical manner of proper construction. From time to time we are asked the question:

"Do the insurance interests actually wish to reduce the fire losses by a better type of construction which will obviously bring about much lower insurance rates?"

Certainly, they do! Generally speaking, the premium income of the fire insurance interest, after paying losses and expenses, has not been sufficient to pay a dividend of two per cent! Of course, as firesafe construction comes into vogue, the premium income will be greatly reduced, but the greater proportionate reduction in losses will establish the business on a sound, money-making basis.

Building officials should not be slow to take advantage of the opportunity offered to them to learn more of the most important subject with which they have to deal—that of safeguarding lives and property. What of the terrible conflagrations due primarily to improper building regulations? What of the wood-shingle roof and tinder-box construction?

Prospective builders are naturally interested in proper construction and the sensible selection of materials and devices. Here is the opportunity to learn the merits of patented forms of construction, to study comparative costs or to learn what constitutes the fire hazard in any type of building, from the $3000 home to the $15,000,000 hotel, and how to lessen the danger.

In the legal department, conducted by an engineer-lawyer well qualified by experience to handle the subject of the law as applied to building projects, materials and practices, will be found much material of direct value to the building fraternity—an opportunity to keep posted on a subject of much importance. In the building industry, which is conducted largely on the contract basis, such a subject as that of arbitration (see Page 289) should prove of great interest.

So, too, in the insurance department, timely subjects will be handled by an expert and all questions answered.

In all, a splendid opportunity for any interested person to increase his knowledge of science and selection in firesafe building construction and equipment.

SAFE HOMES

Edited by **RALPH P. STODDARD, Secretary**
Society Advocating Fire Elimination

Are

You

Awake

?

WHATEVER other ills the burned clay industry of America may have been subjected to, it certainly has never been troubled with insomnia. It sleeps on peacefully. I do not think that it would be unfair to say that it is almost the last industry in the United States to wake up to modern methods of doing business.

The soundness with which the clay man slumbers has just been brought to my attention by the managers of the National Complete Building Exposition that is to be held in the Grand Central Palace, New York, next March. In conversation a few days ago with Mr. F. W. Payne, who is manager of the International Exposition Company, proprietors of this enterprise, he told me that up to the present time no space had been reserved by any brick or tile concern. The chart had not been opened more than a week, said Mr. Payne, before he had inquiries from practically every lumber association in the country. No less than eight or ten of our largest spaces have already been sold to them with contracts signed and first payment upon the contract already made.

"What is the matter with your fireproof fellows?" said Mr. Payne to me.

I am not writing this editorial in the interest of the National Complete Building Exposition, but I am trying to say something that will stir the burned clay interest to take advantage of the opportunity which this show gives them.

This is simply a repetition of the history of the first Complete Building Show held in Cleveland last February. Almost every product used in firesafe building reserved space in that show before the manufacturers of face brick were induced to make an exhibit. I was personally interested in that Exposition, and it was only by the strongest appeal that I was able to make that we got action on the part of the brick manufacturers.

About $5,000 was raised by the face brick manufacturers of the Middle West. A beautiful display was made and considerable literature was distributed. I don't believe there is a face brick manufacturer who contributed to this enterprise who will not say that it paid splendid returns upon the investment—unless he be a confirmed pessimist. In fact I have heard of one who thinks that the Cleveland show was unsatisfactory for the reason that, as such things usually go, it cost more than was first estimated, and he was asked for a second contribution to meet the deficit. "Understand, I say he was asked." If I am rightly informed, he did not acquiesce, although all the others concerned did so. That is the kind of a fellow you would expect to be dissatisfied with anything that cost money.

Mr. Payne tells me that from several manufacturers who were exhibitors in Cleveland he has letters stating that they were well repaid for their expenditure in the Cleveland show. These manufacturers are willing to place an exhibit individually or join with others to make a community display as was done in Cleveland. One manufacturer writes, so Mr. Payne tells me:

"I would not be interested in the New York show for the reason that the Cleveland show has given us more business than we can attend to. We are over-sold."

The figures from the building department of the city of Cleveland would in themselves indicate that the face brick manufacturers have profited by their

The National Complete Building Exposition

New York City

March, 1916

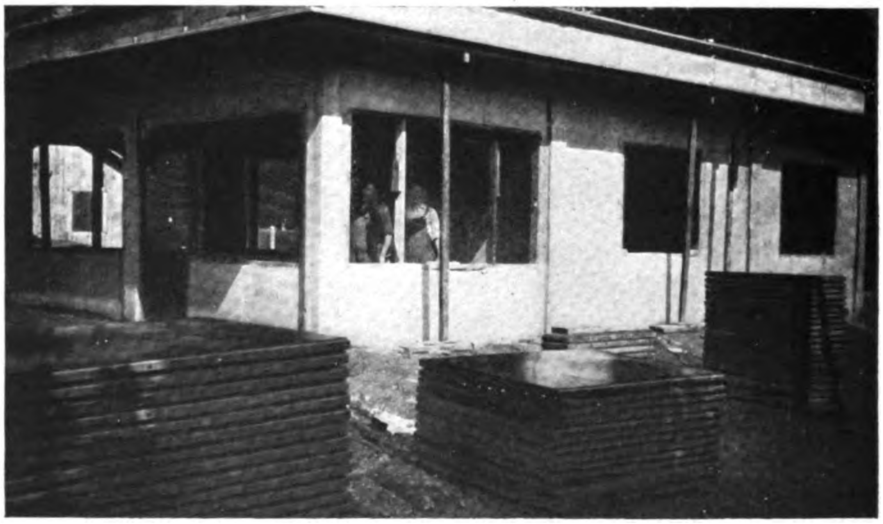
display in the Cleveland show. There is a 100 per cent gain over 1915 in the number of brick houses erected in this city. And in the suburbs, where there are better residence sections, the gain is between 300 and 400 per cent. Cleveland has built more brick homes in 1916 than in any two previous years of its history. The New York show offers an even greater opportunity for promoting the use of this material.

It offers the same opportunity to the manufacturers and dealers in all other fireproof materials and equipment. I am told that several cement companies have already reserved space in the show; that the co-operation on the part of the metal lath manufacturers, gypsum manufacturers, fireproof doors and trim, sprinkler systems and others who are interested in firesafe construction is satisfactory. It seems to be clay alone that is still sleeping. If the face brick manufacturers fail to make the best presentation of their material that it is possible to have at the New York show, they will be the losers to many times the amount it would cost to have such a display. I know personally from the experience of the Cleveland show that thousands of prospective builders go to these places with an open mind. They seek information, and the impressions gained at such a show influences their choice of materials when they are ready to build.

All who are interested in the promotion of firesafe home construction certainly will hope to see face brick properly presented in this big National Complete Building Exposition.

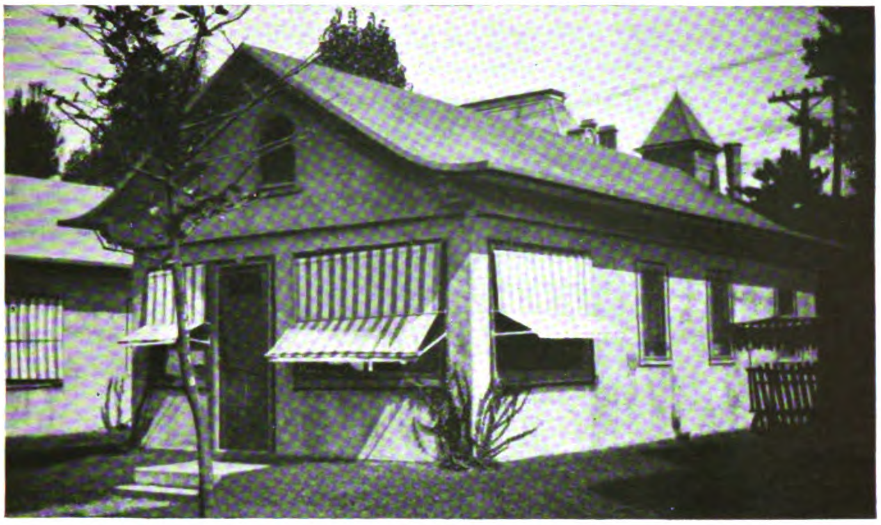
Safe Homes "Poured" in Five Hours

ONE of the most enthusiastic converts to the "fireproof" idea who has come to the attention of those backing the firesafe movement is D. S. Humphrey, President of The Humphrey Company, of which he is the guiding spirit.



At Euclid Beach Park, Cleveland's largest amusement resort, this company adopted the policy of replacing all of the original wooden buildings, as fast as could be done without impairing the efficiency of the park's operation, with permanent ones of monolithic concrete. Already several of the park's buildings have been thus replaced, among these a mammoth garage and office building. Aside from the factor of firesafety, there is little departure in these buildings from the usual type of monolithic construction.

But it is in the matter of cottages for summer campers that Humphrey has made most revolutionary progress. In these he has worked out a number of



Here are shown attractive bungalows of concrete

problems in connection with handling of forms and pouring that places him in the front rank of pioneers.

He has made himself a pioneer, also, in the use of steel frame work and metal lath as a basis for an outside covering of stucco. A number of these cottages are of this type of construction. A variation has been made in the handling of this type of cottage from the usual practice, in that this construction is used for the roofs as well, instead of tin, slate or other of the common roofings.

In all his buildings Humphrey has solved the problem of the inpervious roof. He has taken the old maxim of the cement maker, that "the best re-enforcement for concrete is cement," and applied it to the mixing of the materials for his roofs.

"We have found that the best waterproofing compound for concrete is cement," says Humphrey. "The mix for use on our roofs is rich in cement, and that is all the 'secret' there is to our water-tight roofs."

In testing the roofs of the flat-roofed cottages they were loaded down with sand. In doing this it was discovered that this sand furnished an excellent insulation against heat, so that a portion of the sand was left on the roofs for this purpose.

The Humphrey cottages are poured in special forms made of pressed steel by the Hydraulic-Pressed Steel Co., of Cleveland. Forms for the entire building are set up and the pouring done continuously. A mixer, operated in connection with an elevator, enables an entire cottage to be poured in about five hours. The forms are oiled, preventing adhesion of the concrete to them and resulting in a wall which is plumb and smooth and free from bulges or joint marks.

In some of the earlier buildings paint was applied

Forms of pressed steel for the entire building are set up and pouring done continously to the stucco surfaces, but others not so treated were found to weather to an agreeable color. Painting of later buildings, therefore, has been dispensed with. The fact vines have been planted to over-run the little buildings to add to their homelike appearance has been an added reason for the natural finish.

In these little cottages Humphrey has not aimed at making them year-round houses. They are about twenty by thirty feet in size, and this space has been divided up into kitchen and toilet, which are divided from the rest of the house by monolithic partitions, and one large "L"-shaped room, which serves as porch, sitting room and bed room. As most of the campers are outdoor "fans" this room has awnings only.

As an investment they have proven profitable. Upkeep is reduced to the minimum and higher rentals are easily obtained than for others of frame construction.

Present plans of the company are pretentious, and it will not be many years before Euclid Beach, as it is called, will be an entirely fireproof community.

* * *

Pleasing Stucco Design

FOR a house, the cubical contents of which is limited to 17,300 cubic feet, that shown in the accompanying cut (Page 301) shows many excellent features.

Its simplicity is one of its chief points of excellence. The grouping of the windows, leaving broad expanses of stucco, add much to its beauty, as well as simplifying construction costs.

This design, which is by Warner A. Ebbets, of Philadelphia, is from the book of plans published by the Complete Building Show Co., Leader-News Bldg., Cleveland, Ohio, of plans submitted in its recent contest.

The combined living and dining room is a distinct feature of this house and provides an exceptional amount of room in either in case of emergency. The rooms are conveniently arranged and there is a liberal provision for light and ventilation.

The plain surfaces make this design suitable for a variety of materials, as tile faced with brick or with stucco, or stucco on metal lath.

Its cost would be slightly above or below $4,000, according to the materials used and the quality of the inside finish.

A Home of Brick

(*See Page* 303 *for design*)

THIS brick home embodies a great many features desired by the present-day home builder. Chief of these is the recessed porch, which forms virtually an addition to the living room. A separate dining room is not provided, a practice growing in popularity being to combine these two rooms into one, giving opportunity for one to encroach upon the other when occasion arises. The entrance vestibule is a convenience appreciated by housewives.

Other details of arrangement are good. The stairs are easily accessible from the kitchen. The chambers are of good size and are well supplied with closets.

While costly effects have been avoided by the architect, R. C. Reamer, Cleveland, Ohio, the brick-work is sufficiently varied to lend beauty to the general appearance of the house.

In cities where the cost of labor and materials is not excessive $4,500 should cover the erection of this little home complete and ready to move into.

SHINGLE ROOFING AT BIRMINGHAM, ALA.

AGAINST the bitter opposition of the insurance interests and others concerned in reducing the fire hazard, the authorities at Birmingham, Ala., a short time ago repealed the anti-wood shingle ordinance, the enforcement of which had very materially reduced the loss record of the city.

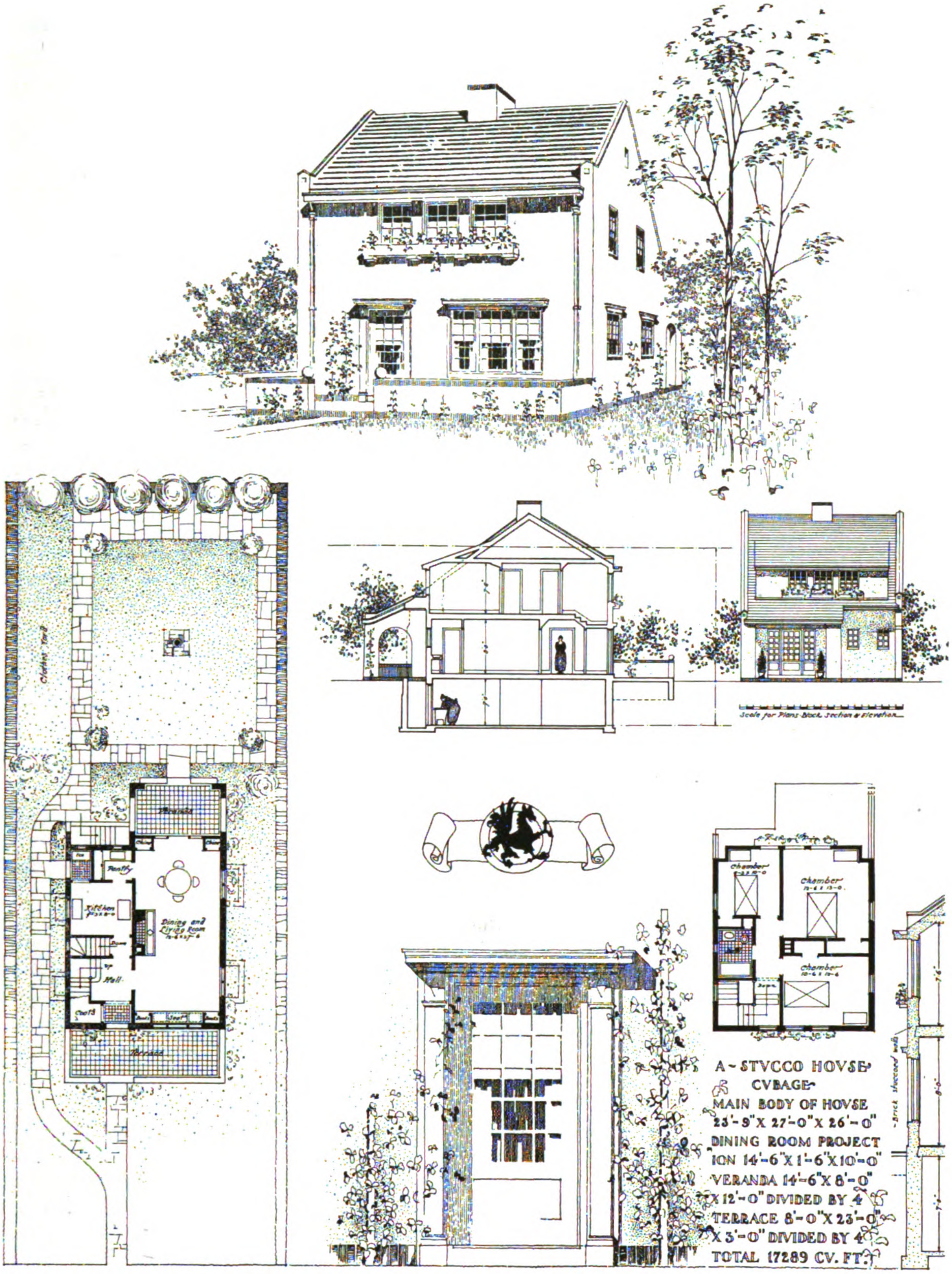
Under the new regulation wooden shingles are now permitted anywhere in the city, save in the fire limits. It is required that all shingles be painted with a good paint, and where repairs exceed one-tenth of the roof area, the entire roof must be painted. All paint used to be approved by the City Building Department.

This retrograde action taken at Birmingham is to be regretted in the light of the city's disastrous fire experience under the former wood shingle roof ordinance, and is hard to understand in view of the vast improvement obtained under the prohibition law.

The attitude of the insurance men in the matter may be inferred from their threats to increase rates in the city.

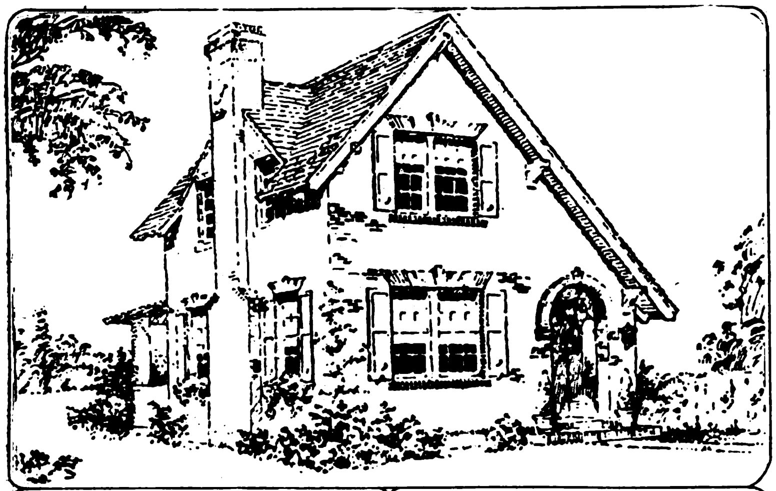
The Proper Construction
of
Palatial Homes

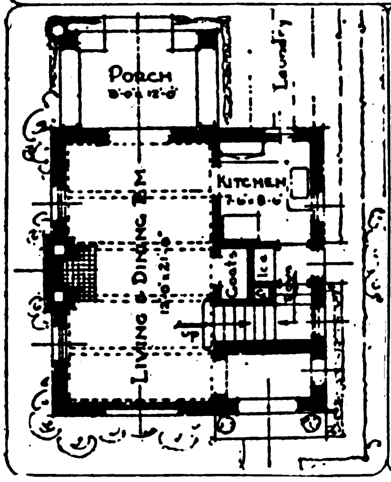
Will appear in the next issue

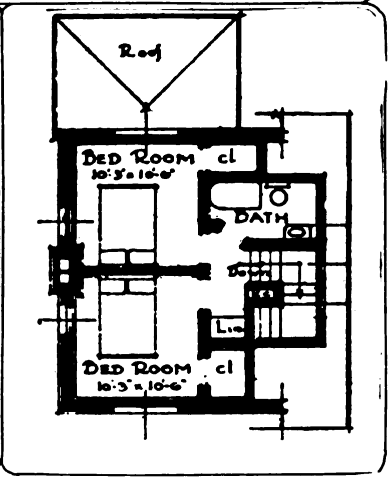


Pleasing Stucco Design

(See opposite page)







Home for Small Family

ONE of the most effective branches of the government of the State of Minnesota is the Art Commission. This department is working in practical ways to encourage an appreciation of the artistic and is making it possible of attainment.

One of its activities is to provide practical homes of character, as a relief for the monotony of houses erected by speculative and by unskilled builders. Its first venture in this line was a competition for farm houses. This resulted in a portfolio of ideal homes for rural inhabitants, plans and specifications of which the Art Commission furnishes at cost.

Recently it undertook a similar competition for small homes of safe materials suited to narrow city lots. The little home in the accompanying cut is one of the products of this undertaking. It was one of the prize winners, as combining the best features both of exterior design and interior planning. A study of the plan will show that the maximum of accommodation has been obtained from the space available.

This little home is designed for the use of hollow tile faced with brick. Its cost is estimated at about $3000.

ONE THING LACKING

By Walt Mason

(Reprinted by permission General Fireproofing Co.)

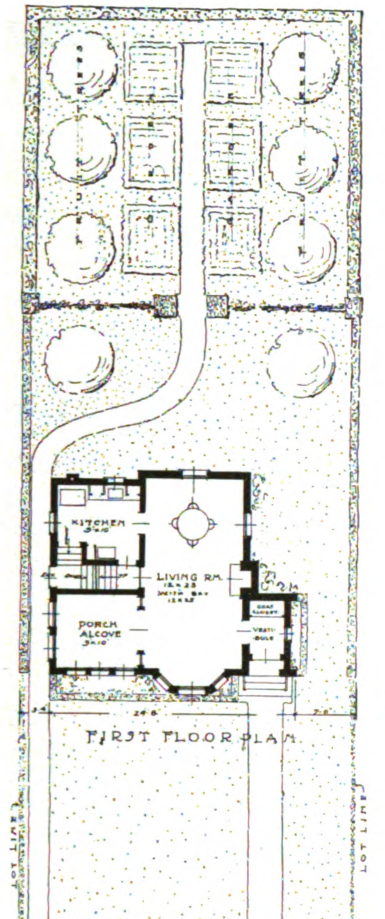
Man builds a stately mansion in which he hopes to dwell until the village churchbells are ringing forth his knell. He says, "By Caesar's whiskers, I will not count expense; I want to have the slickest residence that any man can build me; I want to point with pride to everything outside it, to everything inside."

He builds that gorgeous palace, and paints it red and green; it is the richest wigwam that he has ever seen. It has some daubs of Titian and Rembrandt on the wall, a furnace in the basement, cigar stand in the hall. It is the richest dwelling for miles around, I guess; but since it isn't fireproof, it isn't a success.

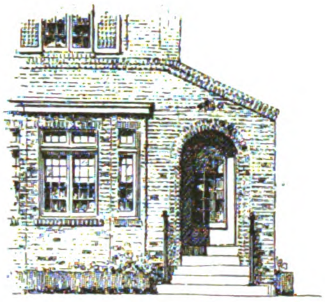
The architect advised him to go in less for show, and for fireproof inventions expend a roll of dough; but no, he couldn't see it, he wanted a display, and fire would never bother round him, anyway. And so he has a palace that only needs a spark to spread it round in ashes upon his well-kept park; and now this fact disturbs him and causes him distress: the house that isn't fireproof is scarcely a success.

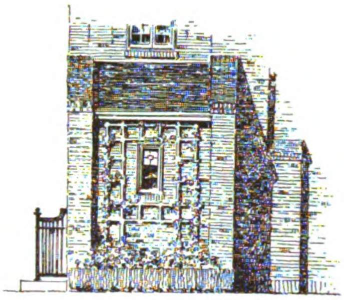
There is a nifty parlor, there is a sleeping porch; a building with its autos, in which a man may scorch; there is a noble kitchen in which domestics toil, and there are costly ranges, on which the kettles boil; there is a bin for raisins, a bin for hazelnuts, there is a butler's pantry, in which the butler buts; there is an elevator, there is a billiard room, and fine electric fixtures dispel the evening gloom; the works of old Nick Carter are on the library shelves, but still the lord and master, who in their pages delve, that there is something lacking will oftentimes confess: the house that isn't fireproof is not a big success.

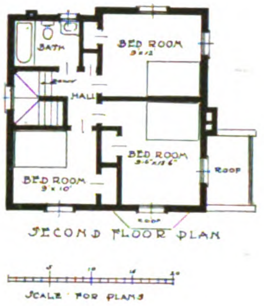
He wishes now his conduct had been more circumspect; he wishes he had listened to Mr. Architect. By day he is uneasy, his sleep has lost its charms, he dreams of hooks and ladders and clanging fire alarms. And to his wife he mutters, "Jemima Susan Bess, the house that isn't fireproof is never a success."



FIRST FLOOR PLAN

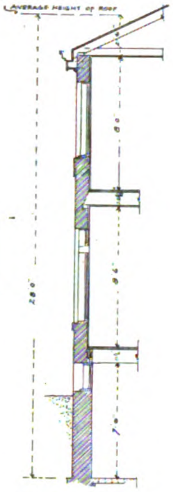






SECOND FLOOR PLAN

SCALE FOR PLANS



¼" SCALE SECTION

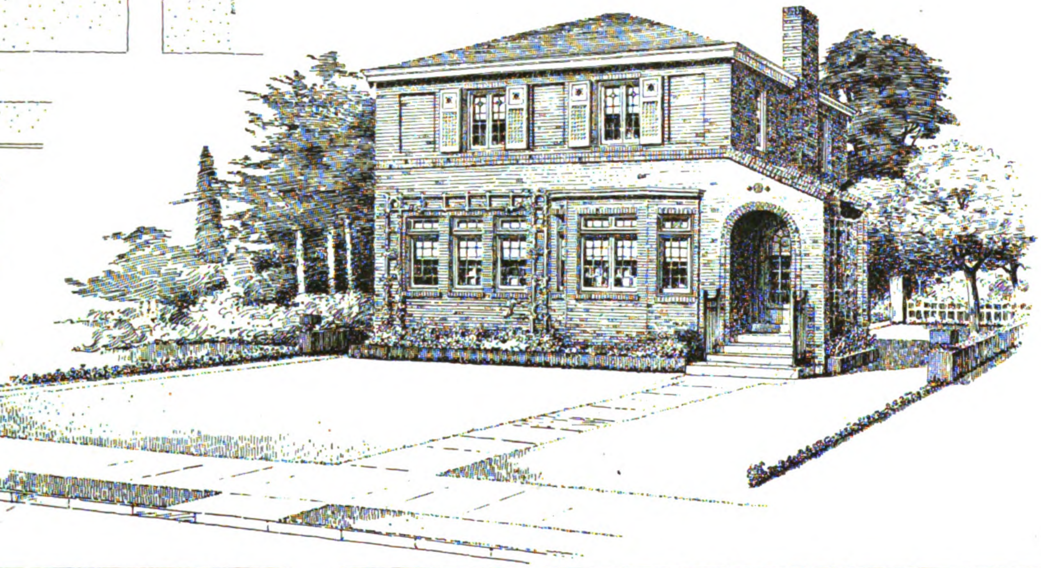
·CUBAGE·

10'6" x 23'6" 246¾ SQ. FT
13'6" x 24'6" 330¾ " "
577½
HEIGHT 28
4616
1154
14
16170 CU FT

BAY
7'0" x 2'0" 14'0"
HEIGHT 16½
84
14
7
231 " "

FRONT ENTRANCE
5'0" x 10'0" 50'0"
HEIGHT 17½'
350
50
25
875 " "

CHIMNEYS 150 " "
17426 " "
@ 17¢
121982
17426
TOTAL COST $2962.42



SUBMITTED BY:

COMPETITION FOR A HOUSE TO COST $3000.
COMPLETE BUILDING SHOW CLEVELAND OHIO 1916

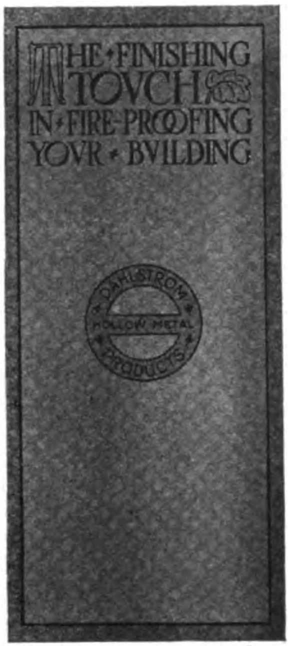
A Home of Brick

(See page 300 for description)

New Literature in the Field of Building Con

Reviews of Books, Catalogs and Other Literature Which Should Be

The Evolution of Fireproof Building Trim



A TRUE definition of the above title can be stated briefly in fifteen words: "Wooden doors, fire-inviting; metal covered doors, somewhat fire-retarding; and hollow steel doors, *fireproof*." That's the whole evolution in concrete form.

The subject is an important one and is coming into prominence more and more. Architects and engineers, owners and investors, builders and the public in general are greatly interested. Fire-prevention associations are formed to promote the use of fireproof materials in buildings and to reduce the enormous annual fire waste of our country. Expensive testing plants have been established for proving the fireproof qualities of new building materials and methods of construction, so that to-day it is possible to construct a building that will be really fireproof—in fact as well as in name.

Wood. From age to age and from century to century, when anyone made a door, be it for a palace or the humblest abode, all just naturally used wood. Whole treatises have been written how to dowel it, to frame it, to panel it, to make it beautiful and to resist warping and twisting, but of wood it has generally been.

Millionaires sometimes pampered themselves with bronze and copper and silver doors, but withal, it is safe to assert that out of every million doors made 999,999 were of wood. If great beauty were desired the precious woods were resorted to, but always WOOD, and well varnished or oiled or painted, which only made it burn more rapidly if fire ever got to it.

Fireproof Paint. Then some thirty years ago the fireproofing campaign started and feeble attempts were made to protect the doors. One couldn't well get away from the thraldom of wood, so it was painted with preparations of alum and of salt and called "fireproof." Companies sprang up like mushrooms that made "fireproof paints." Thus, by a combination of this paint and much faith, wood wouldn't readily ignite for a few minutes, but it burned and burned fiercely mighty soon thereafter, and "fireproof paint" fell with a heavy crash along with many hopes.

Fireproof Wood. Later, retorts and dryers were devised and other means of extracting the resin and highly inflammable components of wood, leaving only the fiber. Wondrous experiments were made and even the government was pulled into it. "Fireproof wood" was all the rage, but after a good fire was started that went too; the wood fiber, the non-resinous, desiccated wood burned and the fire looked pretty much as does an ordinary wood fire. Exit "fireproof wood." One seldom hears of it to-day—'tis ancient history.

Metal Covered Wood. Next upon the scene was tin covered wood or wood covered with more rare and costly metals, but always a basis of Wood. Strange how the human mind clings to precedent—bad precedent particularly. The metal covering had its fling and still flutters feebly among those clinging to bad precedent—bad precedents by tests and facts. Some manufacturers prolonged its career by investing the light gauge iron with mysterious and extraordinary powers. They called it "Kalamein" (Calamine—a special kind of so-called galvanized iron and such), when in reality the original metal used in "Kalamein" work is practically exhausted and is as costly as platinum. To cover a door with it is prohibitive in cost; but then there's a lot in a name. To-day the affair is doddering, great effort is being made to revive it, to instill new life. But the writing is on the wall, the public verdict has been given, the days of the wood-core fire protection are counted, and it will soon be exeunt omnes for the metal covered contraptions.

Thus comments the author of an interesting booklet, "The Finishing Touch in Fireproofing Your Building," recently issued by the Dahlstrom Metallic Door Company, of Jamestown, N. Y.

Those interested will find this booklet a careful and exact treatise on the value and proper installation of the highest development in building trim—hollow metal products.

All literature described above is free of cost unless otherwise designated

struction, Fire Prevention and Protection

in the Files of Every Architect, Contractor and Prospective Builder

Paris, Tex., Before and After the Great Fire

Asbestos Shingles vs. Wood Shingles

LATE in the afternoon of March 21 and before noon of March 22 last more than two-thirds of the thriving city of Paris, Tex., was consumed by fire, which raged over an area of thirty blocks and in addition to eating up the business section destroyed some two thousand homes. During the same twenty-four hours the city of Augusta, Ga., was visited by a conflagration which was not conquered before it had consumed twenty residential and about ten business blocks. The losses at both places mounted to many millions of dollars.

Of course the outstanding lesson was the need of firesafe building materials, especially non-burnable roofing. Paris, Tex., was covered with wooden shingles, to which may be attributed the spread of the flames.

It is this history which has inspired the Keasbey & Mattison Company, Ambler, Pa., to produce their latest piece of business literature, "The Glory That Once Was Paris," a well-printed, attractively arranged, finely illustrated brochure which ought to be *studied* by architects and those about to build. The arguments advanced for real safety in roof construction are unanswerable—for the simple reason that they are based on historical facts. When it comes to a consideration of fire the roof is easily the most vulnerable part of any dwelling, and if but one part is to be properly fireproofed it should always be the roof. Happily more and more people are each year arriving at a realization of this fact.

This attractive booklet has a cover of three folds, which, when opened out, shows splendid panoramic views of Paris before and after the fire.

The Beauty of Terra Cotta Roofing Tile

THE Los Angeles Pressed Brick Company of Los Angeles, Cal., has just issued a most artistic and instructive brochure on the subject of terra cotta roofing tiles. This booklet is profusely illustrated with fine-looking examples of all types of buildings, in the construction of which this type of roofing has been used. Blue prints and specification details and photographs show clearly the various designs of tile and methods of construction. In all a publication of distinct value to the building fraternity.

An Interesting Monthly Publication

EVERYONE interested, or likely to be interested, in the subject of metal furniture should have their name placed on the complimentary mailing list to receive this monthly publication of the Art Metal Construction Company, Jamestown, N. Y.

A well-illustrated little magazine, filled with snappiness and the spirit of "push," it records the rapid development of this branch of the fireproofing industry, giving examples of successful protection against fire losses, new designs in metal furniture and also containing data of interest to selling agencies.

All literature described above is free of cost unless otherwise designated

Warns Against Defective Chimney Flues

In 1915 Kansas, says State Fire Marshal L. T. Hussey, had 265 fires caused by defective flues. These fires destroyed property valued at $214,492.

There is no necessity for defective flues. Practically every dollar of this loss was preventable. Most of this loss occurred in the winter, working great hardship on people who were driven out of their homes in all kinds of weather and at all hours of the night.

During the coming winter another two hundred thousand dollars or thereabouts will go up in smoke from the same cause, and two hundred more families will find themselves homeless in the cold and snow.

And it will be entirely their own fault.

It is an easy matter to inspect a chimney. If you are not enough of a mechanic to do it yourself you can employ some competent person for almost nothing.

Chimneys that are used for supports for wooden timbers in the building should be condemned and their use discontinued until the evil is corrected. Many fires start from this cause. Either the wood becomes hot enough to burn or the weight resting on the timbers causes the chimney to settle, leaving a crack through which the flames escape.

Bracket chimneys are so hazardous as to be almost criminal. The brackets supporting the chimney almost invariably settle in time, throwing the chimney out of line and causing the opening of cracks between the bricks. Then comes the fire.

The winter season is almost here, when fires will be in full blast and your property and your lives will be in danger.

Severe Arraignment of Wood Shingle Roofs

(*Continued from page 292*)

Second street. At this time the main body of the fire was between Sixth and Seventh streets, four blocks west. This point is of paramount importance as demonstrating the part played by shingle roofs in this conflagration. It is further stated that almost immediately after this building ignited numerous buildings with shingle roofs on both sides of Broad street in this vicinity seemed to burst into flame simultaneously, the next block attacked being the north side of Broad street between Second and Forsythe. In this block shingle roof dwellings predominated.

Under "Lessons to Be Learned from the Fire" we find: "The danger of shingle roofs and the manner in which they spread fires beyond the ability of a fire department to handle, with ordinary wind blowing, even when a fair proportion of the buildings are brick and have non-combustible roofs and buildings are not congested; and the further fact that wide streets do not form a fire break when shingle construction is present."

I have dealt with these three conflagrations in considerable detail because they are fresh in all your memories and constitute a strong and practical example of the dangers to which our citizens allowing wood shingle roof coverings are constantly exposed, because all of those fires having occurred in the Southern States, I have felt in peculiarly close touch with them.

Harking farther back and yet not going beyond the memory of man, I would remind you of the terrible fire in my own city of Jacksonville in 1901, when shingle roofs ignited for blocks ahead of the main fire, and we suffered a loss of several lives and $17,000,000; of Yazoo City, Miss., in 1904, with a loss of $2,000,000; of Chisholm, Minn., in 1908, with a loss of $1,700,000; of Chelsea, Mass., in 1908, with a loss of $12,000,000; of Fort Worth, Tex., in 1909, with a loss of $800,000; of Wallace, Idaho, in 1910, with a loss of $1,000,000; of Bangor, Me., in 1911, with a loss of $3,500,000; of Houston, Tex., in 1912, with a loss of $4,500,000; of Hot Springs, Ark., in 1913, with a loss of $2,225,000; of Salem, Mass., in 1914, with a loss of $13,000,000.

With such a record staring you in the face, gentlemen, is there any possible, reasonable or plausible argument against the menace of the shingle roof? Again, can its retention find justification even on the basis of economy?

Day of Reliable Wood Shingles Passed

In years gone by, when good cypress shingles were obtainable, with long life and cheap maintenance and no substitutes in the shape of fire-resistive coverings other than tin, slate or tile, and again with lower density of population and consequently more land and less congestion of buildings in the residence sections of our cities, many convincing arguments could be adduced as to why the wood shingle roof should play its part in building operations. That day has forever passed. Now, instead of No. 1 cypress shingles, reliable for life and service, we have, with the decrease of our lumber supply, low-grade shingles from poor lumber with short life, unreliable service and comparatively high prices, against which may be purchased and put on at reasonable prices fire-resistive prepared roofings or shingles with guaranteed life, elimination of maintenance costs and lower insurance rates. And while such roofings are not comparable to tile, concrete, brick, tin or slate, nor suitable for roofing buildings in the congested value districts, they are far superior in every respect to the wood shingle and effectively eliminate the conflagration hazard for which it is responsible.

Most cities, like individuals, are guilty of the sin of inertia, and to that only can I ascribe the apathy of so many of our municipalities to the crying evil and menace of the wood shingle roof.

WEATHER: Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., November, 1916

Priceless

SIGNS OF THE TIMES

At Ashland, Ky., the State Fire Marshal's office recently ordered torn down within thirty days fifty frame houses in the central section of this thriving and progressive city. Not a brick, hollow tile, concrete or stucco dwelling was condemned.

Very evidently the up-to-date Fire Marshal of this city is awake to the responsibilities of his department and is determined that no breeding spot for conflagrations or death traps shall exist in Ashland if it is within the province of his office to wipe off the map such an undesirable and dangerous cluster of bonfire material.

Thousands of communities here in the United States contain similar hazards, any one of which may any hour rise up to consume the city which it has endangered and shall continue to threaten as long as it is permitted to remain.

Atlanta, Ga., recently passed an ordinance prohibiting the use of wooden shingles for roofing purposes in that city after January, 1917. The repair of more than 50 per cent of a roof area with wooden shingles is likewise prohibited after the above date.

Another Kentucky town—Carlisle by name—which recently lost by fire eight buildings, has passed a new ordinance, according to the terms of which these structures will have to be replaced by something besides frame.

And another indication of a slow but certain realization of the benefits of firesafe building construction by architects, municipal authorities and the general public is the report from the Euclid Builders' Supply Company, Cleveland, O. (which is but one of many received), to the effect that this concern is facing a demand for materials which is far greater than last year. The most pressing problem is where to get sufficient labor.

As the true story of modern firesafe construction becomes known, townships and municipalities will in such increasing number rewrite their building codes and fire ordinances, excluding inflammable materials, that a recitation of such items will become common news. Assuredly, America is awakening to an era of new building methods and materials, a type of construction in which the dominant requirement will be *safety from fire.*

◆

Average costs often mean a "deadly average."

◆

THE FERGUSON SYNSTONE SYSTEM

Thomas A. Edison has done more useful things, perhaps, than any other man of modern times. This many-sided genius has broadened the vision of thousands and taught the world to expect almost anything. Not so long ago, when he proclaimed that science would make possible the erection of a concrete house at no greater cost than that of wooden construction, he was quoted in the press throughout this country and Europe. The world gave eager attention to his statements.

Among the men inspired by Mr. Edison's example and prediction was John A. Ferguson, of Denver. For many years he had been experimenting and consulting with engineering authorities in order to perfect the Synstone system which to-day bears his name.

The Synstone system of hollow wall building embraces a new method of concrete block wall construction that costs no more than common frame and, being *firesafe*, immediately offers, aside from the important item of cost, numerous additional superiorities which should commend its investigation by those contemplating the erection of structures of three stories and under—business buildings, homes, outbuildings, small factories, garages, etc. It offers concrete structures at no greater cost than frame, the exterior of which may be faced with beautiful granite, white marble, sandstone or other natural materials.

In composition Synstone is composed of a large aggregate of stone in the following mixture, in units 12 by 24 inches, making two square feet of wall per block: 1 part Portland cement, 2½ parts of sharp sand and small gravel or broken stone, 4 parts of broken stone at least 1 inch in size. The use of the large aggregate reduces the cost of the blocks and strengthens them. Properly mixed, over one-half of the Synstone composition is already stone before the block is begun.

Where art facings are desired only ¼ inch of facing material

McKIM, MEAD AND WHITE

The Architectural Book Publishing Company, of New York City, has already brought out twelve parts of a twenty-part (large folio) *Monograph of the Works of McKim, Mead and White,* which will take in the achievements of that most noted firm of architects from 1879 to 1915.

This elaborate *Monograph* is most comprehensive in scope, admirably presented, "and furnishes a worthy record of achievement that seems to have no parallel in the work of any other firm in this country."

Chronologically arranged in the order of their completion, over one hundred and fifty different buildings are shown, covering a wide range of style, study and subject.

Certainly such a noteworthy work should find a first place in the library of every well informed architect.

◆

Handsome does who handsome plans.

is used in a mixture of 1 part cement and 3 parts of the natural stone or ground marble.

MODEL FIRESAFE CITY OF MORGAN PARK, MINN., BUILT OF SYNSTONE

Quick Production—Strength

The Synstone mixture must be made so wet that it quakes in the mold when slightly tamped. Dry or semi-dry mixtures *must not* be used. Under the Synstone method all voids or crevices in the block are filled solid. This makes it a solid, inseparable stone, as dense and impervious as granite.

But blocks made of such a wet mixture as this must be made speedily, else the cost of production would be prohibitive. *The Synstone method has met the speed problem.* Thus Synstone has been made practical for widespread use.

Mr. Ferguson devised a shape for the block that enables it to stand up when immediately removed from the machine. It does not have to be left there to harden. Synstone blocks can be stacked to the side as rapidly as taken from the machine. In two weeks they will be as hard as nature-made stone.

Yet this block is also the correct shape and dimensions to give the proper wall size and structural strength. *Three thousand pounds per square inch may be applied without fracturing a block of Synstone.*

Synstone blocks can be made for either 8 or 12-inch hollow walls with the Synstone machine. Eight inches are sufficient for any three-story ordinary construction. Twelve can be used wherever the local building regulations require it.

Tests of Synstone

Mr. Ferguson worked out his system more than three years ago, but did not proceed immediately to put it on the market until it was subjected to tests and he was satisfied, through practical performance, that it would meet all requirements for the field to which it is adapted.

The first test was building two one and one-half-story and basement residences of a 6-inch wall, the usual ordinance requirement being 16 inches for the basement, 12 inches for the first story, and 8 inches for the second floor wall. The strength and rigidity of these 6-inch walls satisfied Mr. Ferguson that Synstone could be relied upon to perform its duty under all conditions.

The final test of the Synstone system was made by the Minnesota Steel Company, of Duluth, a subsidiary of the United States Steel Corporation. The engineers of the steel company subjected Synstone to extreme tests, giving it their full approval and adopting this system of construction for use in erecting their entire model city of Morgan Park, Minn.

The machinery since invented by Mr. Ferguson and the new simple method of art facing was not available for the construction at Morgan Park. In consequence, the walls of the buildings in the steel company's model city were unfaced and the cement on the walls was not washed off. But aside from this, the strength and rigidity of the buildings were found to be so satisfactory that the company decided to construct their own office building, laboratory and stores of the Synstone wall 8 inches thick. In the office building and laboratory these walls support fireproof concrete floors and roof and are not reinforced in any way. The steel company, instead of using wood lath for the inside of the wall, used firesafe plaster board, which requires less plaster than wood lath.

The engineers and architects of another large corporation, the Loyal Order of Moose of America, have also adopted this system for all the residences in their $5,000,000 worth of buildings at Mooseheart, Ill., 35 miles from Chicago, where that organization is constructing an industrial school and home in connection with their work.

All blocks for these buildings are faced with ¼ inch of granite, mica and feldspar, producing a natural granite result that is reputed to be equal in appearance and have more life than hand-cut granite.

The Perfected Synstone Machine—Construction

Since these tests of Synstone, Mr. Ferguson has perfected the present Synstone machine. The block it produces and the speed and ease with which it is operated far exceed the earlier method of manufacture

Synstone buildings are tied together with steel that makes them practical structures for zones affected by cyclones, earthquakes and other natural disturbances. This steel binding member occurs at each floor course, and at the roof course is bedded in cement-mortar and bolted together at the four corners of the building. As every block in the building is laid in cement-mortar, the whole structure becomes a monolith and is practically indestructible.

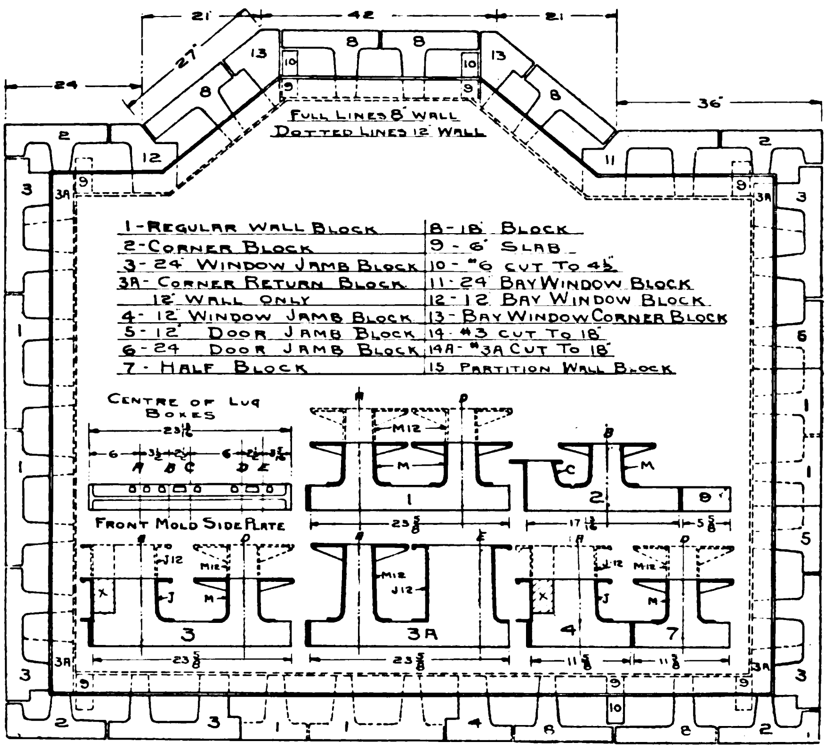
Those interested in Mr. Ferguson's Synstone system may obtain full data by writing the Ferguson Synstone Company, Century Building, Denver, Col.

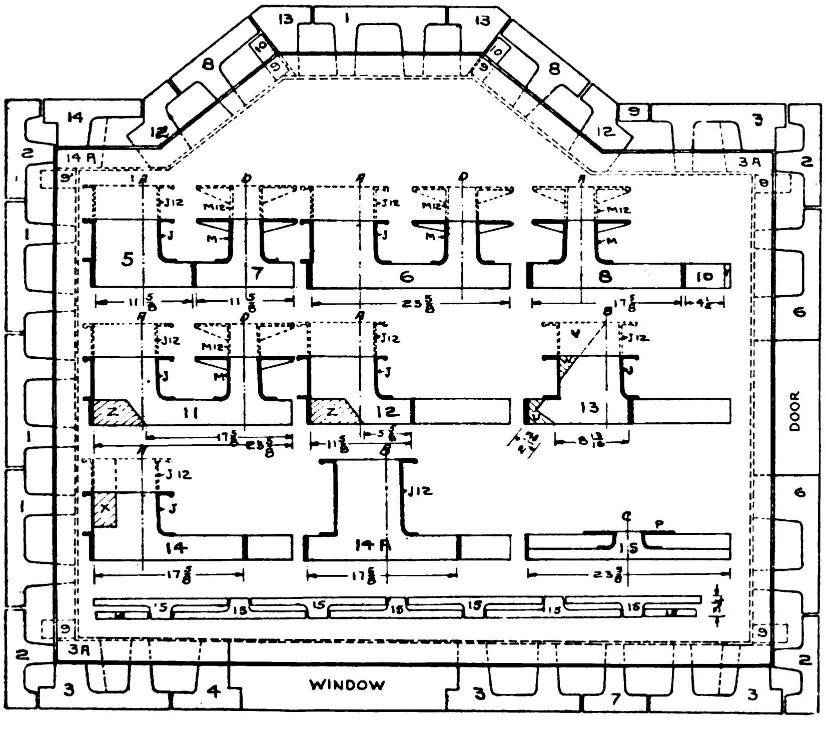
Showing Different Blocks Used in the Construction of the Synstone System

The two wall illustrations show alternate courses in a residence and the manner in which the blocks bond over each other in every case.

In the center of the wall illustrations are shown the blocks necessary for residence construction and the manner in which they are made in the Synstone machine.

The solid lines indicate the 8-inch wall—the dotted lines the 12-inch wall.





(*Other "Synstone" illustrations will be found on page 313.*)

SHORE DINNERS FOR S. A. F. E. MEMBERS

In planning the annual social "get-together" of its members, the Society Advocating Fire Elimination, Cleveland, O., this year made especial efforts to please the ladies. The affair was held at the East Shore Country Club and was attended by more than one hundred people. Besides a genuine New England shore dinner, the happy Fire Eliminationites enjoyed an automobile ride to the club, dancing, tennis, swimming, baseball, and, among other feats, a cabaret run entirely by S. A. F. E. members. Following are some of the brilliant stars who helptd to make things merry: Ernest Roberts, of the Kelly Island Lime and Transportation Company; William Dougan, of the Cleveland Builders' Supply Company; Irving Geist, of the Geist Building Material Company; Louis Powell, of the Bostick Metal Lath Company, and several other talented artists.

TENTH CHICAGO CEMENT SHOW

The unusual number of manufacturers and producers of building materials and concreting equipment who have already made application for space at the Tenth Chicago Cement Show makes it highly probable that builders who attend the 1917 show will find an even wider range of products and equipment than was presented at the ninth show. In addition to the standard machines which will be displayed, a number of the better of the new machines and devices which have been developed since the last show will be on exhibition.

Every possible effort is being made by the show management to conserve the available space in order to accommodate as large a number of applicants as possible. Exhibitors have been requested to make application for the minimum amount of space in which their exhibits can be installed, and the arrangement which eliminates the drawing for space and permits the management to make direct assignments should do much towards saving space and making the show truly representative of the industry.

The Joint Exhibit of cement companies at the tenth show will in all probability excel the last exhibit in real educational value. Cement manufacturers have contributed more money for the exhibit, and the plans to show concrete products in the making should make this exhibit worthy of careful study. The following Portland cement companies have already signified their intention of participating. It is probable that several other companies will also be represented:

Ætna Portland Cement Company, Alpha Portland Cement Company, Burt Portland Cement Company, Chicago Portland Cement Company, Crescent Portland Cement Company, Diamond Portland Cement Company, Dixie Portland Cement Company, Huron Portland Cement Company, Wyandotte Portland Cement Company, Ironton Portland Cement Company, Kosmos Portland Cement Company, Lehigh Portland Cement Company, Louisville Portland Cement Company, Michigan Portland Cement Company, Newaygo Portland Cement Company, New Egyptian Portland Cement Company, Northwestern States Portland Cement Company, Peerless Portland Cement Company, Peninsular Portland Cement Company, Union Sand and Material Company, Universal Portland Cement Company, Wabash Portland Cement Company, Wolverine Portland Cement Company.

The American Concrete Institute will convene in Chicago, at the Hotel La Salle, Feb. 8, 9 and 10, 1917.

◆

The "wet process": See what a woman's tears can do to move a man.

◆

NEW FIRESAFE CONCERNS

Hamilton Decorative Tile Company, San Diego, Cal., will erect new plant on Venice boulevard, Culver City, Cal.

Tuthill Brick Company, J. B. Tuthill, president, will open common brick plant near Blue Island, Ill.

W. C. Stevens, Macon, Ga., and W. S. Stapler, Milledgeville, Ga., have asked for a charter for the Stevens Brick Company, Macon, Ga.; capital stock, $5,000.

Frank, Frank F. and Margaret Foster, of Foster & Son, brick makers, have filed articles of incorporation with the Secretary of State, Idaho, placing their capital stock at $50,000. The plant was established a short time ago on the Foster ranch near Boise, Idaho.

Shawnee Flash Brick Company, Shawnee, O., has been reorganized by the bondholders who purchased the outfit at a receiver's sale some while ago. The present owners are: John Koontz, D. L. Mauger, J. J. Enlows, L. W. Tussing.

Grand Rapids (Mich.) Brick Company, reorganized as the Clay Brick Company after increasing its capital stock to $100,000, has sold out its entire interest to a new concern by the same name. O. M. Carter is vice-president and general manager of the new concern. John J. Moroney is president; C. L. Ross, secretary. William J. Clark is manager.

W. E. Dowlin Brick Company has remodeled and enlarged the plant at Billings, Mont., and is now manufacturing 25,000 brick daily.

Delaware Clay Products Company, Ohio, has expended $50,000 to build an addition to its plant and install new machinery.

Flood & Hall, Inc. (Fairview Brick Company), Detroit, Mich., has increased its capital stock from $50,000 to $75,000.

Topper Bros., Columbus, O., who a short time ago purchased the plant and property of the Vinton Clay Products Company, Ohio, have resold their interest to C. V. Neal, Montreal, Canada, who will put the plant in condition to produce face brick.

Clifton-Aldin Brick Company has been incorporated at Philadelphia, Pa., capital stock $100,000, to make clay products. F. R. Hansell, Philadelphia; George H. Martin and S. C. Seymour, both of Camden, N. J., are the incorporators.

J. J. Allen, who recently purchased from the Pennsylvania railroad a 23-acre tract of land, will expend $50,000 to erect a brickmaking plant. The ground is at the intersection of the Philadelphia and Bustleton division of the Pennsylvania Railroad and the Frankfort division of the Reading Railroad.

Barkwill-Farr Brick Company, 222 Leader-News Building, Cleveland, O., represents a merger of four of the largest brick companies in Cleveland, comprising ten plants, as follows: Barkwill Brick Company, American Building Brick Company, Cuyahoga Brick and Shale Brick Company, and the Farr Brick Company. The capital stock of the new corporation is $4,000,000, all of which is common stock. No mortgage or debts of any nature exist, and the combined capacity of the ten plants is 1,000,000 brick and 60,000 5x8 tile per day. The officers of the company are: Ernest S. Barkwill, president; Robert J. Dawson, vice-president; Lawrence B. Koblitz, treasurer; John J. Jackson, secretary; Herbert J. Farr, general manager, and chairman of the board, Earnest W. Farr. Robert C. Mitchell will be sales manager.

Simons Brick Company, of Los Angeles, Cal., has decreased its capital stock from $600,000 to $300,000.

The Fireproofing News

COLLEGE ERECTS FIRESAFE BUILDING

Iowa State College, Ames, will this fall erect a tile farm poultry house designed to meet the requirements of typical farm conditions. The structure will be designed in four sections, to accommodate about 400 fowl. Simplicity of construction will be the keynote. The building is so planned that any number of sections may be added. As the cost per section will only run $150, it is expected that many farmers will avail themselves of this opportunity of studying a practical example of modern poultry house construction.

Whitman-Krewson Clay Products Company, Wilmington, Del., has incorporated with a capital stock of $200,000.

Charles Henderson, of Butte, Mont., is reported to be interested in establishing a brick plant at Buhl, Idaho.

Whiteland Tile Company has filed incorporation papers with the Secretary of State at Indiana for a brick and tile plant, with capital stock of $25,000. Incorporators are W. J. Wright, R. T. Ditmers and J. S. Wright.

Grant Ramsay, H. W. Spaulding, R. G. Coutts, C. A. Smith, Paul Essler, J. T. Lyman, T. J. Bray and W. F. Vogt on Sept. 30 purchased at public auction the Grinnell Brick and Tile Company, Iowa, for a consideration of $28,650.

Raleigh E. French, Clarence Carter, Henry Nicholson, Thad Thompson and H. B. Westengerger have incorporated the Zanesville Clay Novelty Company, Ohio, the capital stock being $10,000.

Farmville Brick and Ice Company, North Carolina, capitalized at $40,000, will erect a plant at Farmville, N. C.

Kane Bros. have disposed of their brick and tile plant at Mount Pleasant, Mich., to Dr. C. D. Pullen, F. L. Klunzinger, B. M. Gould and S. E. Francis, the present owners, who plan extensive improvements.

William J. Lyle, Charles Kimball and Robert W. Lyle have incorporated, with a capital stock of $25,000, the American Hollow Tile Company, New Brunswick, N. J.

Roundup Brick and Tile Company, Montana, have begun to produce brick at the rate of 20,000 a day.

C. W. Hurtgen, L. G. Morgan and Roy Todd, who recently incorporated the Liberal Impervious Brick Company, Missouri, with a capital stock of $600,000, will erect a plant at Liberal, Mo.

E. F. Knight, K. C. Knight and D. J. O'Neil have incorporated, with a capital stock of $10,000, the Buffalo Clay Products Company, New York, for the purpose of manufacturing pottery, brick, tile and earthenware.

H. R. Sturtevant, T. D. Howell and M. C. Spratt have organized, with a capital stock of $200,000, the Financing Corporation, Buffalo, N. Y., to manufacture brick and tile and deal in stocks and bonds.

New Lexington Clay Manufacturing Company, Ohio, has been reorganized, the plant producing rough-face face-brick exclusively. A. Garlinger is president; J. O. Cullen, secretary and treasurer; W. H. Geis, vice-president and general manager, and Charles A. Smith, general superintendent.

Milwaukee Pottery Company, West Allis, Wis., recently incorporated by L. Weis and H. F. Schuette, has just completed an extensive plant equipped with modern machinery.

◆

LUDOWICI-CELADON IMPROVES PLANT

The Ludowici-Celadon Roofing Tile Company, New Lexington, O., one of the largest exclusive manufacturers of roofing tiles, is making many extensive improvements at its plant, including the construction of a new kiln. About fifty additional men will be needed to carry on the work when renovations and betterments are completed.

◆

Commandment for New Yorkers: "Shove thy neighbor as thyself."

◆

Over $9,000,000 represents the 1916 Canadian forest fire loss, a sum equal to more than six times the amount spent from coast to coast for forest protection work.

LARGEST GLASS "ZOURI" SET

The largest plate glass in the United States was "key set" in a safety setting manufactured by the Zouri Drawn Metals Company, Chicago Heights, Ill. A single sheet of glass, it measured 27 feet wide and 10 feet high, and was set without mishap in the Permanent Manufacturers' Exhibit, Exposition Building, Dallas, Tex. This record-breaker weighs 1,000 pounds and required twenty men to remove it from the crating and place it in position for setting. It was "rested" on two Murnane self-adjusting setting blocks, each block being fourteen inches from either end of the window.

The adjustable leather-covered anti-friction plate on which the glass rested made it possible to move this huge piece into perfect contact with the rabbet by exercise of thumb-and-finger pressure on the key, and without lifting it from the block.

Then the outer molding was applied, which was drawn up and locked by the Helicoid screws, with which all "Zouri" key-set sashes are equipped.

◆

Alterations should not mean altercations.

◆

BRICKMAKERS MEET IN ST. LOUIS

The Brick Manufacturers' Association of St. Louis, Mo., recently met at the Fernglen Hotel, Belleville, Ill. Warren Ittner, J. W. Kloess, C. P. Tomlinson and Edward Abend, all of the Belleville Brick and Tile Company, acted as hosts. Following are those present from St. Louis: B. F. Ittner, St. Louis representative of the Belleville Brick and Tile Company; E. J. Ryan, American Pressed Brick Company; Herman Bromschwig, College Hill Pressed Brick Company; O. C. Oehler, Continental and Enterprise Pressed Brick Companies; W. P. Grath, Illinois Supply and Construction Company; John Bass, Hydraulic-Press Brick Company; H. C. Koenig, Missouri Pressed Brick and Improvement Company, and J. Stocke, Jr., Progress Pressed Brick and Machinery Company.

◆

"These goods not to be removed until the pile opposite is gone!"

Looking Ahead!

¶ Ninety-nine per cent. of all new building construction is not actually firesafe—

¶ —because proper fireproofing materials and protective devices are not purchased and properly employed.

¶ CONSTRUCTION is encouraging more stringent fire safety laws—bringing home to architects, owners and prospective builders a realization of the value of consistent firesafe materials—

¶ —developing a vast market for

CEMENT BRICK TERRA COTTA
GYPSUM STEEL HOLLOW METAL

METAL FURNITURE
FIREPROOF DOORS AND WINDOWS
FIRE SHUTTERS WIRE LATH

AUTOMATIC SPRINKLERS
CHEMICAL EXTINGUISHERS
FIRE ALARM SYSTEMS

This is *your* work and should be supported when your 1917 advertising schedule is laid out.

The International **FIRESAFE** *Building Publication*

CONSTRUCTION

The *only* publication *exclusively* devoted to consistent, firesafe, building construction.

Office Building, Minnesota Steel Co., Model City, Morgan Park, Minn. Synstone Fireproof Construction Throughout. 8-Inch Walls, Concrete Floor and Roof

Detailed View, Granite-Faced Synstone Construction

COST OF 1915 BUILDING OPERATIONS

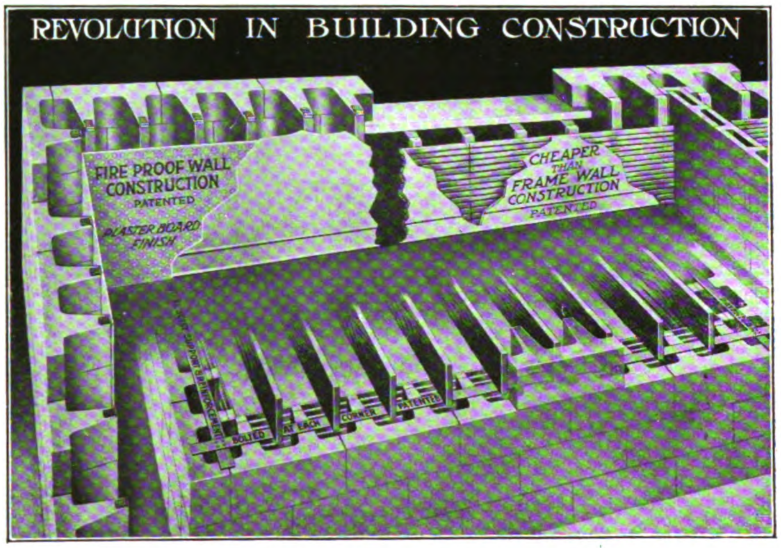
According to the U. S. Geological Survey, 1915 marked an increase in many of the larger cities. Six hundred and forty-one million seven hundred and sixty-nine thousand one hundred and ninety-nine dollars was expended for building in 48 selected cities. This is an increase over the previous year (1914) of more than $22,000,000. In building construction New York leads with figures reaching more than $103,000,000. Chicago, leading city in 1914, took second place for 1915, with buildings costing more than $97,000,000. Brooklyn, N. Y., is third, with $45,601,851, an increase of over $3,000,000 as against the sum expended in 1914.

◆

Rubbing elbows with the right company is the only profitable friction.

STRUCTURAL MATERIAL RESEARCH LABORATORY

The Portland Cement Association and Lewis Institute, both of Chicago, have entered an agreement whereby they will jointly conduct the Structural Material Research Laboratory of Lewis Institute, which was created to conduct experimental researches in concrete, reinforced concrete and other concrete materials, and to instruct the students of the Institute regarding the properties of concrete and other building materials. This splendid educational work is in line with the laboratory at Germany operated for 15 years by the German Association of Cement Manufacturers.



REVOLUTION IN BUILDING CONSTRUCTION
FIRE PROOF WALL CONSTRUCTION PATENTED
PLASTER BOARD FINISH
CHEAPER THAN FRAME WALL CONSTRUCTION PATENTED

Synstone Wall Construction

Less than 5%

of the building of the U. S. is consistently fireproof.

That's the claim of the manufacturers of Firesafe materials and equipment. It also is their claim that the country's best engineers say that the consistently firesafe building is cheaper in the long run.

EDUCATION IS NEEDED!

The best opportunity for Education is offered the manufacturer and dealer in

THE NATIONAL BUILDING EXPOSITION

Grand Central Palace, New York

March 5, 6, 7, 8, 9, 10, 11, 1917

Thousands of builders, contractors, engineers and architects from all parts of the country will attend this big Exposition daily—many trade conventions will bring them to New York.

Make reservations at once—
First floor already 50% sold

Eastern Office:
GRAND CENTRAL PALACE
NEW YORK

Western Office:
352 LEADER-NEWS BLDG.
CLEVELAND, O.

N. Y. STATE INDUSTRIAL SAFETY CONGRESS

The State Industrial Commission at the Hotel Onondaga, Syracuse, N. Y., on Dec. 11, 12, 13 and 14, will hold its Industrial Safety Congress.

At the morning and afternoon sessions experts will give addresses on fire prevention, factory sanitation, safeguarding of machinery and other factors related to industrial safety, to be followed by open discussions on each topic. Included in the list of topics are: "Duty of Workers in Co-operating with Safety Organizations," "Duty of Employers in Prevention of Accidents," "Attitude of New York State's Organized Industry Toward the Safety Movement," "Classification of Buildings and Materials as a Basis for Safety Requirements," "Guarding of Fixed Machines," "Factory Conditions and the Shop Committee," "Practical Benefits Derived from Safety Organization," "Factory Lighting, Heating and Ventilation." Illustrated lectures by the National Safety Council and American Museum of Safety will furnish the evening features.

Employers, employees and the general public are equally interested with this commission in raising the standard of industrial safety in New York State so high that it will be accepted as the standard for the entire industrial world. It is with this end in view that this Congress is called.

The following statements are from the cordial invitation sent out by the Commission: "We expect to profit by your experience, and undoubtedly the joint experiences of all will result in mutual benefit to such a degree that this conference will be an annual event.

"We feel sure of your co-operation, but want to be assured of your personal participation in this Congress.

"Please advise us as soon as possible the names of those who will represent your organization, as the Commmission wishes to provide those in attendance with a personal badge of identification.

"If you are an employer, come yourself and bring along your superintendent and factory foremen. If you cannot be present, it is urged that you send your superintendent and factory foremen, that they may reap the educational benefit of this Safety Congress."

The State Industrial Commission is at Albany, N. Y. (the Capitol), and the New York office is at 230 Fifth avenue. Henry D. Sayer is secretary, John Mitchell is chairman, assisted by Edward P. Lyon, Louis Wiard, James M. Lynch and William H. H. Rogers.

◆

Buying lots is often "lottery."

◆

WELL-KNOWN BRICK MAN RETIRES

George Cutter, for fifty years president and general manager of the Sheridan Brick and Tile Company, Sheridan, Wyo., retired from the business when the establishment changed hands. Carl F. Kneisel is the new secretary, treasurer and general manager. The new owners plan extensive improvements and will greatly increase the capacity of the outfit, which, since its organization, has supplied all of 90 per cent of the brick used in Sheridan.

◆

Always buy luxuries first—necessities you have to have anyway.

◆

CERAMIC ESSAY CONTEST WINNERS

B. T. Sweely, Iowa State College, and Earl E. Libman, University of Illinois, both students of their respective colleges, were prize winners in the ceramic students' essay contest conducted by "Brick and Clay Record" from last May 15 to June 15.

Mr. Sweely came off with highest honors, receiving a percentage of 79 for his paper on "Porous Brick by Use of Sawdust." "Kiln Arches," the title of Mr. Libman's essay, got 77.5.

◆

THE TALLEST CONCRETE CHIMNEY

The Weber Chimney Company has written to the Portland Cement Association as follows: "We are at the present time building the highest chimney in the world—in Japan, for a copper smelter. This chimney is 567 feet high and 26 feet 5 inches inside diameter at the top. It is more than 60 feet higher than any chimney ever built of any type of construction for any purpose."

TRADE NOTES

At the recent convention of the National Association of Stationary Engineers at Minneapolis, Minn., the Keasbey & Mattison Company, Ambler, Pa., and with a Minneapolis office at 427 Washington avenue, made a display of their asbestos roll fibre felt.

◆

H. W. Johns-Manville Company, with Minneapolis office at 18 Eighth street South, at the recent annual convention held at that city by the National Association of Stationary Engineers, arranged an exhibit of asbestos products.

◆

Architect R. G. Pierce and Engineer N. Ronneberg, Otis Building, Chicago, Ill., are receiving bids for the proposed one-story warehouse, 66x200 feet, to be built of combination tile and concrete slabs, for the International Roofing Company, 5301 South Western avenue, Chicago, Ill.

◆

Paul Gerhardt, architect, Chicago, Ill., has designed the large garage to be constructed at a cost of $50,000 for the Wheeling Corrugating Company, Wheeling, W. Va., next to its new plant at Campbell and Arthington streets, Chicago.

◆

Thomas P. Kearns, formerly State Inspector of Workshops and Factories, Ohio, is now secretary of the Builders' Exchange, Dayton, O. He succeeds Michael Redelle, now welfare director for the Dayton Engineering Laboratories Company.

◆

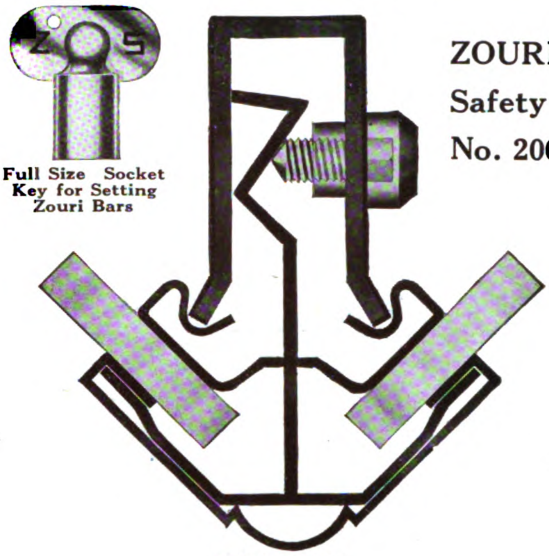
Johnstown, Pa., contractors are discussing the organization of a Builders' Exchange. The Master Builders' Association may consider the proposition, as the younger element among the contractors of Johnstown are actively interested in seeing the idea realized.

◆

At a meeting held on Aug. 25 some forty of the prominent builders of Montgomery, Ala., planned to reorganize the Builders' Exchange, widening its scope to such an extent as to make it practically a new organization.

ZOURI

Safety Store Front Construction



Full Size Socket Key for Setting Zouri Bars

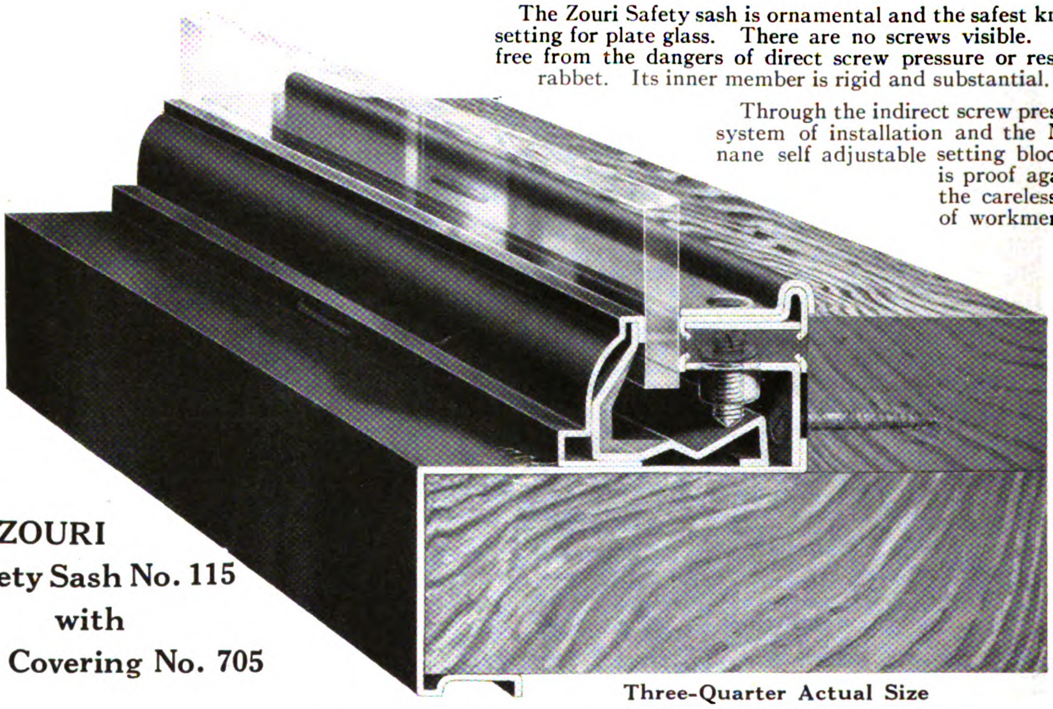
FULL SIZE

ZOURI
Safety **Key-Set Corner Bar**
No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



ZOURI
Safety Sash No. 115
with
Sill Covering No. 705

Three-Quarter Actual Size

DETAILS MAILED ON APPLICATION

Zouri Drawn Metals Company

1813-1833 East End Avenue **Chicago Heights, Illinois**

Operating under Murnane and Marr Patents

AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

FACE BRICK MANUFACTURERS' PLAN CONVENTION

The executive committees of the American Face Brick Association and the Face Brick Dealers' Association, in joint session at Cleveland, O., Oct. 6, decided that the next annual convention of both associations will take place at French Lick Springs Hotel, Indiana, on Dec. 6 to 8.

French Lick Springs was the meeting place of the face-brick makers in 1913 and 1914.

In no sense will the December meeting be an "annual banquet," as the manufacturers desire that the coming conference shall be devoted wholly to business, with the social and entertainment activities reduced to a minimum. Few, if any, papers will be read.

Another departure from the proceedings of former conventions lies in the decision to throw the meeting open to non-members, who may be present at all the scheduled conferences, excepting those for executive sessions.

It is the purpose of the face-brick men to eliminate the unessential and get right down to business while at the convention, for which reason a big gathering is anticipated.

Among the topics to be discussed will be cost accounting, "open price" for next year, standardization. Incidentally, it is expected that a large number of delegates will be present from companies not yet enrolled as members of the association.

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Discussing differences beats cussing antagonists.

◆

INVESTING BUILDERS' ASSOCIATION

As a result of the new Zoning and Height Limit Restrictions Law, New York City, the Investing Builders' Association has been organized to treat as a unit with sub-contractors and to attend to labor law matters and legislation which may prove oppressive and unwarranted. Following are the officers for the ensuing year: J. E. R. Carpenter, president; A. M. Bing, first vice-president; Edgar E. Levy, second vice-president; David Tischman, secretary.

The difference between an owner and a hero is that one has his deed recorded in history, the other in the county clerk's office.

◆

CANADIAN NATIONAL CLAY PRODUCTS ASSOCIATION

According to Gordon C. Keith, secretary and treasurer of the Canadian National Clay Products Association, the executive committee, at a recent meeting at Hamilton, Ontario, began the preparation of a program for the convention of the association, to take place Jan. 23 to 25, 1917, at the Royal Connaught Hotel, Hamilton. Following are the officers and committees:

President—J. Edward Frid, Hamilton.

First vice-president—A. F. Greaves-Walker, Toronto.

Second vice-president — Thomas Kennedy, Swansea.

Third vice-president — William Burgess, Todmorden.

Secretary-treasurer—Gordon C. Keith, 32 Colbourne street, Toronto.

Councillors—C. B. Lewis, Milton; D. A. Lochrie, Toronto; John S. McCannell, Milton; Ryland New, Hamilton; Herbert Desjardins, Montreal; Albert Neal, Kingston; Walter Clark, Corunna, and T. Graham, Inglewood.

Auditors—C. B. Lewis and William Burgess.

Committee on Technical Education — A. F. Greaves-Walker, chairman; Charles A. Millar, Millard F. Gibson, Joseph Keele, William Burgess, W. McCredie, J. E. Frid and Gordon C. Keith.

Committee on Entertainment—D. A. Lochrie, chairman; J. E. Frid, C. A. Millar, J. S. McCannell, R. New, William Burgess and Gordon C. Keith.

◆

The man who goes to a summer resort for a rest and a change finds that the waiters get his change and the hotel gets the rest.

◆

It is reported that $1,000,000 worth of Carthage stone and polished marble will be used in the new $15,000,000 Commonwealth Hotel, planned for the Times Square district of New York City.

CLEVELAND FIRESAFE DEALERS COMBINE

The Lake Erie Builders' Supply Company and the Cleveland Brick Sales Company, both of Cleveland, O., recently amalgamated, the Lake Erie interests taking over the latter company, according to reports from J. P. Jerka, general manager of the Lake Erie Builders' Supply Company.

The Cleveland Brick Sales Company, managed by H. F. Kemper and specializing in face-brick, will continue to handle the accounts of the Beaver Clay Manufacturing Company, the Claycraft Company and the Belden Brick Company. Mr. Kemper will be manager of the new combination under Frank Alenbach, sales manager of the Lake Erie Builders' Supply Company, which will remove its present office, East Fifty-fifth street, near St. Clair avenue, to the office of the Cleveland Brick Sales Company, Scofield Building.

◆

Bid low and the world bids with you,
Bid high and you bid alone.

◆

BRICKMAKERS TO MEET IN NEW YORK CITY

The National Brick Makers' Association will hold its next convention at the Hotel McAlpin, Broadway and Thirty-fourth street, New York City, from March 4 to 11. This is the first time the metropolis has been selected by this association, previous conventions having been held at Philadelphia, Old Point Comfort, Washington and points on the Atlantic coast.

It is interesting to note that the second annual Complete Building Show, which started and met with such success last year at Cleveland, will take place in New York City, in the Grand Central Palace, on March 5 to 11, inclusive, about the same time as the brick manufacturers meet. Plans are moving to make this second Complete Building Show much larger, more diversified and comprehensive in scope than was the first annual Show.

These two big firesafe events will bring a vast attendance of manufacturers and others interested in modern building materials, and, beyond doubt, will do much to advance the fireproofing cause.

REYNOLDS

FIRE SAFE

TRADE MARK H.M.R. ESTABLISHED 1868
APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS

SHINGLES

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

If your dealer cannot supply you write the factory.

H. M. Reynolds Asphalt Shingle Co.
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

Do Business by Mail

It's profitable, with accurate lists of prospects. Our catalogue contains vital information on Mail Advertising. Also prices and quantity on 6,000 national mailing lists, 99% guaranteed. Such as:

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Cheese Box Mfrs.
Shoe Retailers
Auto Owners
Wealthy Men
Ice Mfrs.
Doctors
Axle Grease Mfrs.
Fly Paper Mfrs.
Foundries
Farmers
Fish Hook Mfrs.

Write for this valuable reference book. Also prices and samples of Fac-simile Letters.

Have us write or revise your Sales Letters.

Ross-Gould, 1009 N. Olive Street, St. Louis

Ross-Gould
Mailing Lists St. Louis

If you are a Manufacturer *of* Firesafe Material or Protective Devices,

consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advancos and proves the argument for proper fireproofing
and
(2) what it actuall accomplishes to increase the use of firesafe materials and devices.

The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building planning, construction, equipment and maintenance.

The second purpose is accomplished by *actively fighting for legislation favoring firesafe construction* and against laws permitting the continued use of wood——and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that *makers of fireproof materials are now getting but one per cent of the business which ought to be theirs,* that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the co-operation it merits.

STUCCO SURFACES THAT DO NOT CRACK AND DISCOLOR

The discoloration and cracking in sand-finished stucco surfaces has presented a trying problem to many builders. The suggestions of so prominent an authority as William M. Kenney, engineer for the Universal Portland Cement Company, should interest building contractors all over the country.

Mr. Kenney says that check and cracking of sand-finished stucco surfaces can be minimized by careful attention to details. Discoloration, however, presents difficulties which are admittedly hard to overcome. On sand-finished surfaces it is far more difficult to overcome discoloration than on surfaces which are given a rough-cast finish. The latter can be applied fast enough to finish the whole side of a house in a day's time, and once finished requires no further manipulation. But a sand-finish takes more time, as smaller areas must be gone over in getting a proper mixture, thus increasing the chance of discoloration. Though much rests on properly proportioned mixtures, the result is still largely up to manipulation. This involves skill and thoroughness on the part of workmen, for the manner in which they trowel the surface influences the color. Poor troweling results in different shades.

Too much working and troweling on sand-finished surfaces brings an over-abundance of fine material to the surface, causing, especially in floors and sidewalks, checking and cracking. Over-richness of mixture also causes trouble. For a sand-finished stucco surface the last coat should generally be one sack of cement to two and one-half of fine aggregate.

One experienced plasterer has suggested that when the finish has been applied, floated and troweled, the workmen go over the surface after the finish has begun to harden, using a float covered with soft carpet or felt, in order to even up the appearance of the wall both as to texture and color. In this way he believes surface checking can be overcome, and the chance of discoloration greatly lessened.

Hot sun or winds produce rapid drying of stucco surfaces, which results in checking to a considerable extent; under such conditions the surface should be protected by hanging wet blankets in front of the wall and keeping them wet for several days, or by spraying the wall with water frequently after it has hardened sufficiently to prevent injury.

In discussing the same problem, J. M. Gibson of the Clinton Wire Cloth Company also contributes some interesting information. He says that outside stucco should never finish less than 1 inch thick. That allows ⅜ inch for a scratch coat, ½ inch for a blown cast and ¼ inch for the finish coat.

The utmost care should be exercised in selecting the sand for stucco; it must be absolutely free from loam or any organic matter. Not only will dirty sand prevent the proper curing of cement, but it will discolor the fresh coat. Sand used in stuccoing should be clean, coarse and angular, the cement of the best brands obtainable; and if lime putty is used, it should be well seasoned and not to exceed 10 per cent. The best hair binder or fiber should be used in the scratch coat, but it is not necessary in the brown coat. Before applying one coat on another the preceding coat should be scarified, scratched and thoroughly dampened so as to prevent the absorption of water from the new coating.

In applying the finish coat, to obtain what is known as a sand finish, slight excess of sand is used in the mixture, and the plaster is not allowed to get very wet. The sand should be large-grained and coarse.

It is not well to trowel the external coat too much, as it is apt to cause the plaster to crack and scale off. All cement surfaces will ultimately develop incipient cracking or hair-cracks. In a rough sand-finish these cracks do not show except on close examination.

If the above specifications are followed, good workmanship and absolutely the best of materials are used, with a special emphasis on clean, coarse sand, there should be no trouble in obtaining a stucco exterior which will become more beautiful as time goes on.

PERSISTENCY IN ADVERTISING

One stroke of a bell in a thick fog does not give any lasting impression of its location, but when followed by repeated strokes *at regular intervals* the densest fog or the darkest night can not long conceal its whereabouts. Likewise a single insertion of an advertisement—as compared with regular and systematic advertising—is in its effect not unlike a sound which, heard but faintly once, is lost in space and soon forgot.—*Printing Art.*

◆

"KNICKERBOCKER KOMMENTS"

The current number of this publication, the house organ of the Knickerbocker Portland Cement Company, 30 East 42d Street, New York, N. Y., has just been read and, like all its predecessors, it is in the front rank of bright, newsy, instructive and entertaining company ambassadors. Those who buy cement should ask to have "Knickerbocker Komments" sent to them regularly.

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

THE LAKEWOOD MASON SUPPLY CO.

DEALERS IN

BUILDERS SUPPLIES

and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const.Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

OFFICES AND WAREHOUSE:

11201 BEREA ROAD

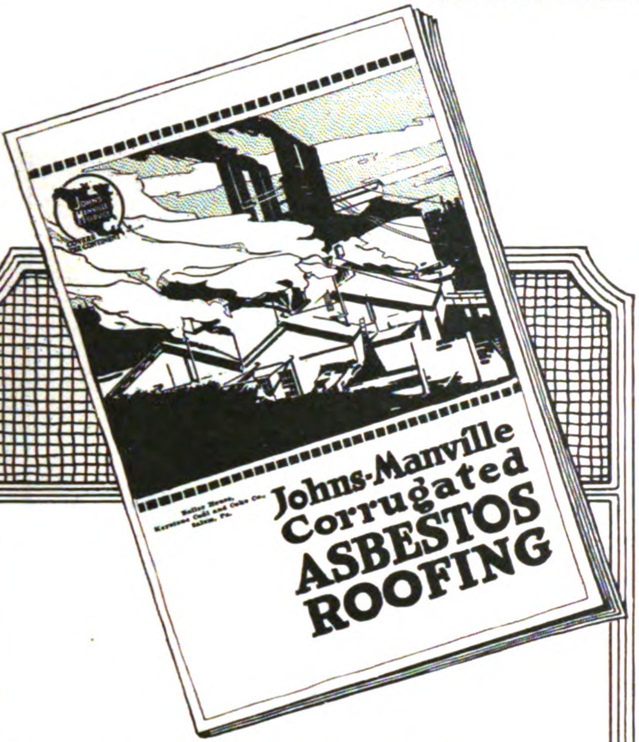
LAKEWOOD, O.

"What Fools these Mortals Be"

An honest business family, consisting of manufacturers, jobbers and retailers, is driving through the forest of distribution to the market place. The woods are beset with hungry wolves, and the only safe route is along the well-marked road of intelligent advertising. The driver is a safe and experienced Advertising director and the members of the party are armed with cash resources, ability and experience, with which they may fight their common enemy, the wolves. They are all anxious to obtain the profits awaiting them at the market place and they show some impatience at the time the journey requires. Finally there is a dispute as to a shorter course to be followed. The manufacturer, the jobber, the retailer and the consumer, each insists on dictating the way. Suddenly they seize the reins and the frightened horses plunge off the established road. Then the men attack each other, each striving to control. Their weapons are turned against each other and immediately their common enemies, Fraudulent Advertising, Dishonest Merchandising, and Unfair Competition come closer to the sleigh. The wolves realize that their victims are being prepared for them. Their jaws snap eagerly in anticipation of the feast. It is evident that the entire party is doomed if the family conflict continues. One by one the members will be dragged down by the wolves. Their fate is inevitable—but harken! Hear those shouts at a distance! Another party is approaching at top speed! There is yet hope, for it is the Vigilance Patrol maintained by The Associated Advertising Clubs of the World. Business will be rescued! The guns of the truth-in-advertising forces will be turned on the marauders and the family will be conducted to the safety of public confidence.

This is one of a series to Advertise Advertising—by the Associated Advertising Clubs of the World (headquarters Indianapolis). The illustration is used through the courtesy of the publishers of "Puck" The text was prepared by Merle Sidener, chairman of the National Vigilance Committee of the Associated Advertising Clubs. Write for booklet, written for buyers like yourself. Every man or woman who buys any kind of commodities will find it profitable reading.

ASSOCIATED ADVERTISING CLUBS OF THE WORLD
TRUTH



Let this booklet help you

With photos, text and working drawings, it tells the story of

Johns-Manville
Corrugated
Asbestos Roofing

The Roofing that is Proof Against Rust

J-M Corrugated Asbestos Roofing has all the advantages of corrugated iron plus the protection of a practically impenetrable envelope of asbestos and asphalt.

The metal reinforcement of J-M Corrugated Asbestos Roofing is hermetically sealed against the rust-provoking action of moisture, salt air and acid fumes. As this roofing never needs paint or repairs, it not only outlasts corrugated iron many times over, but gives more economical service, because its first is its last cost.

Johns-Manville Corrugated Asbestos roofing can be applied directly to skeleton frames of either wood or steel construction with either nails or bolts, just as corrugated iron.

The J-M Corrugated Asbestos Roofing Book tells the whole story of this roofing in an interesting way. With sketches and working drawings, it will enable you to properly present the story of this roofing to your client. Remember to send for *your* copy today—better do it now.

MAIL THE COUPON TODAY.

H. W. Johns-Manville Co.

New York City

Branches in 54 Large Cities

H. W. JOHNS-MANVILLE CO.
296 Madison Avenue, New York
Please send me the Corrugated Roofing booklet. ....
....
....

POMEROY FIRE RETARDANT WINDOWS

Not Made to Meet a Price, but to Set a Standard of Service

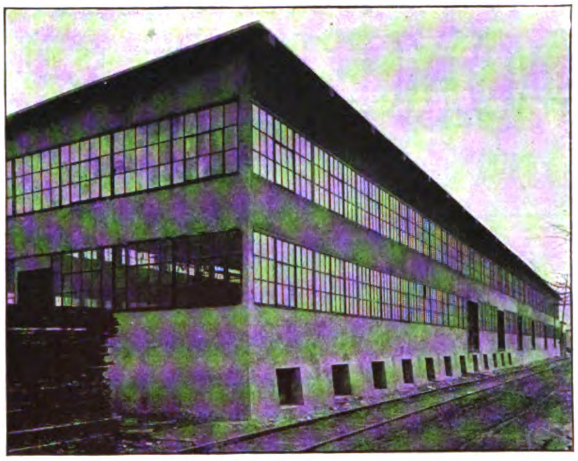
FROM time immemorial, the disposition of some to wander off after false gods has tried the faith of the orthodox—but has not destroyed that faith. Windows come and go—in endless procession of "improved" and freakish types. It is, however, a matter of repeated experience that, for all-around window satisfaction, there was never the equal of the double-hung up-and-down sliding window. We make some twenty-seven standard types of **Pomeroy** Windows—good honest windows, all of them. But we consider the **Pomeroy** Double-hung Window the best general-purpose window of them all. And many architects and owners agree with us—after bitter experience with other windows.

Ask Us To Show How and Why

SAMPLES FILED WITH ARCHITECTS SAMPLES CO NEW YORK CITY

S. H. POMEROY COMPANY, INC.

30 EAST 42ND STREET NEW YORK



Utica Heater Co., Whitesboro, New York
Trussit Walls in Construction

"Trussit"

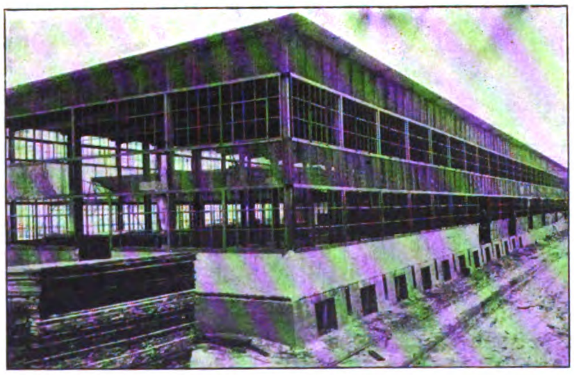
Fireproof Walls and Partitions

There is nothing about Trussit itself to burn, and imbedded in cement plaster, it gives absolutely fireproof construction.

There are also construction advantages. Trussit partitions can be erected without permanent studding, and temporary studding required can be placed much more rapidly than the permanent studding. The sheets are easily erected. There is absolutely no waste of plaster, as the first coat applied forms the foundation for the second coat applied on the reverse side. This economy of construction has made it a great favorite with the building trades throughout the country.

Trussit is uniformly distributed through the cement or plaster forming an integral part of it, and makes possible the economical erection of curtain walls and partitions but two inches thick that are space saving and wonderfully rigid. Learn more about Trussit. Send for the "Fireproofing Hand Book" which gives details and specifications for the use of Trussit.

The General Fireproofing Co.,
812 Logan Avenue, YOUNGSTOWN, OHIO



"The Largest Fire Insurance Company in America"

ORGANIZED 1853

ELBRIDGE G. SNOW, President

"Service" in Fire Insurance

Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.

It means a "SERVICE" to Policyholders which is unexcelled. The Company's equipment includes:

1. Experts in every branch at its Head Office and in the Field.
2. Agents throughout the United States and its possessions, and in Canada, to write Policies.
3. Complete facilities for the Prompt Adjustment of Losses.

The advice which may be had gratis from the Department of Improved Risks, located at the Head Office, will be found especially valuable to large insurers.

Ask any "HOME OF NEW YORK" Agent, or address inquiry to Department of Improved Risks, 56 Cedar Street, New York City.

ALL BRANCHES OF FIRE INSURANCE

Automobiles, Commissions, Hail, Marine (Inland and Ocean), Parcel Post, Profits, Registered Mail, Rents, Sprinkler Leakage, Tourists' Baggage, Use and Occupancy, Windstorm.

STRENGTH REPUTATION SERVICE

The International FIRESAFE *Building Publication*

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House for Two Families

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Published on the fifth of each month by Constrvction Publishing Co., Inc.

George A. Watson, Pres.

1457-1463 BROADWAY
New York, N. Y.

C. Stanley Taylor, Sec.-Treas.

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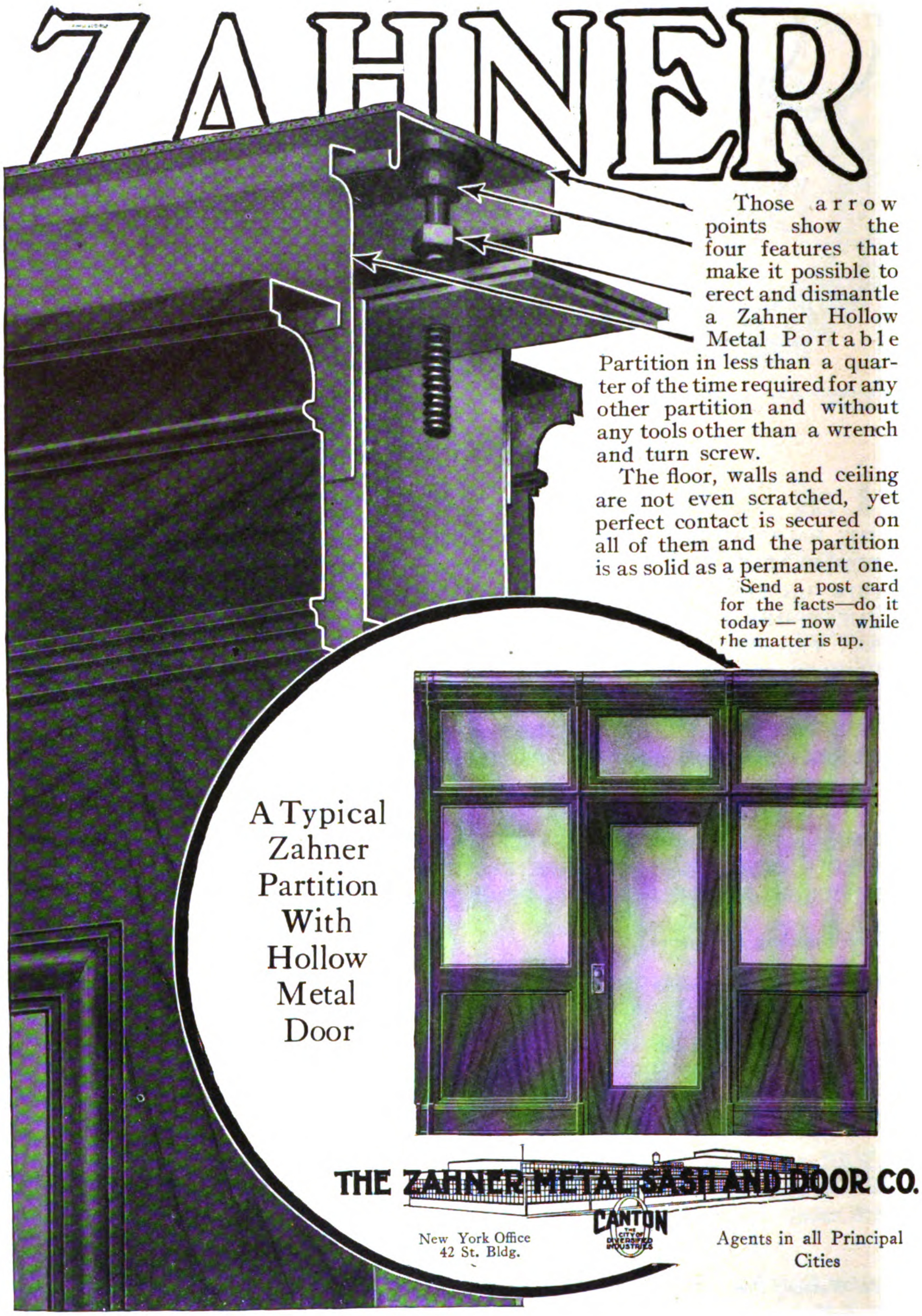


ZAHNER

Those arrow points show the four features that make it possible to erect and dismantle a Zahner Hollow Metal Portable Partition in less than a quarter of the time required for any other partition and without any tools other than a wrench and turn screw.

The floor, walls and ceiling are not even scratched, yet perfect contact is secured on all of them and the partition is as solid as a permanent one.

Send a post card for the facts—do it today — now while the matter is up.

A Typical Zahner Partition With Hollow Metal Door

THE ZAHNER METAL SASH AND DOOR CO.

New York Office
42 St. Bldg.

Agents in all Principal Cities

Union Arcade Building, Pittsburgh, Pa. F. J. Osterling, architect; George A. Fuller Company, general contractors.

In Big Industrial Buildings

TO plan a building of this size is, of course, to specify the use of NATCO Hollow Tile — for safeguarding against fire; for structural lightness; for speed and economy of erection.

In all, about 11,000 tons of NATCO Hollow Tile were employed in the Union Arcade operation: 450,000 sq. ft. of NATCO arches; 225,000 sq. ft. of partitions; 90,000 sq. ft. of girder covering; and 85,000 sq. ft. of column covering.

Write for complete information on NATCO — "the material that made the skyscraper possible"—and the great modern advantages it gives to *every* form of building construction.

NATIONAL·FIRE·PROOFING·COMPANY

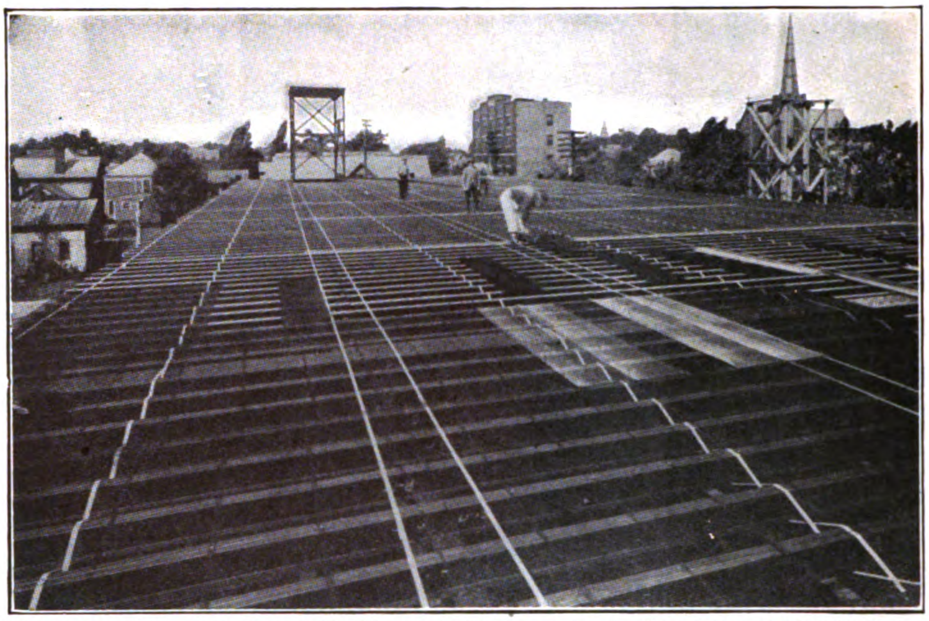
394 FEDERAL STREET PITTSBURGH, PA.

Other Offices:

New York Chicago Boston Philadelphia
Washington Syracuse Detroit

23 factories in the United States,
and also at Hamilton, Ont., Canada

ARE YOU BUILDING FIREPROOF?



Canton Motor Car Co. Bldg. Berger's Metal Lumber used for floors and roof. Berger's Expanded Metal Lath used in connection.

Let safety be the backbone of your building plans. Eliminate combustible wood construction—build fireproof.

Berger's

Metal Lumber

(Patented)

costs less than any other fireproof construction and only 3½% to 10% more than wood. This slightly extra first cost is more than offset by the added safety, strength, durability, ease of erection and lower insurance rates resulting from the use of Berger's Metal Lumber.

Official, practical fire load and water tests have proven it fireproof and indestructible. It is also sound, damp and rodent proof. Adapted to any class of building and ideal for winter erection.

Write for full particulars and Technical Bulletin L. C.

The Berger Manufacturing Company, Canton, Ohio

Branches: Boston New York Philadelphia Chicago St. Louis Minneapolis San Francisco Los Angeles
EXPORT DEPT.: BERGER BLDG., NEW YORK CITY, U. S. A.

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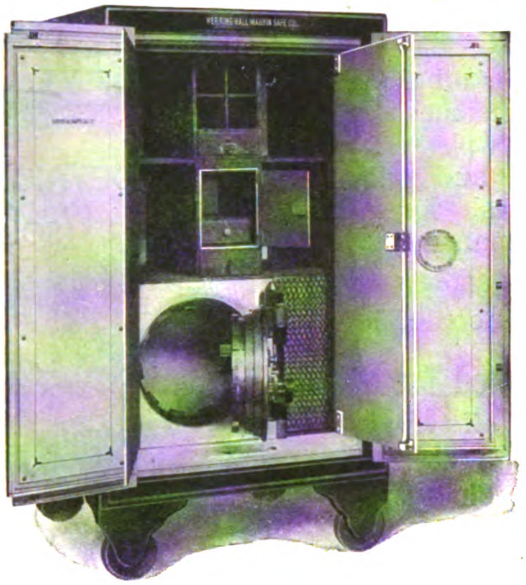
HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



Fireproof and Burglarproof

SAFES, VAULTS & SAFE DEPOSIT BOXES

For Offices, Residences, Banks and Bankers

We offer the benefit or our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.

Plans and Specifications furnished without cost

Executive Offices
400 B'way, New York

Factories
Hamilton, Ohio

Branches

Boston, Mass. ***San Francisco, Cal.*** ***Chicago, Ill.***
Birmingham, Ala. ***New York, N. Y.***

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

Kno-Burn
TRADE MARK

Expanded Metal Lath

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

North Western Expanded Metal Co.
Manufacturers of all types of Expanded Metal
958 Old Colony Bldg., Chicago, Ill.

. . The . .

BARKWILL-FARR CO.

BRICK and TILE

MADE RIGHT
SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

Fireproofing Information Bureau

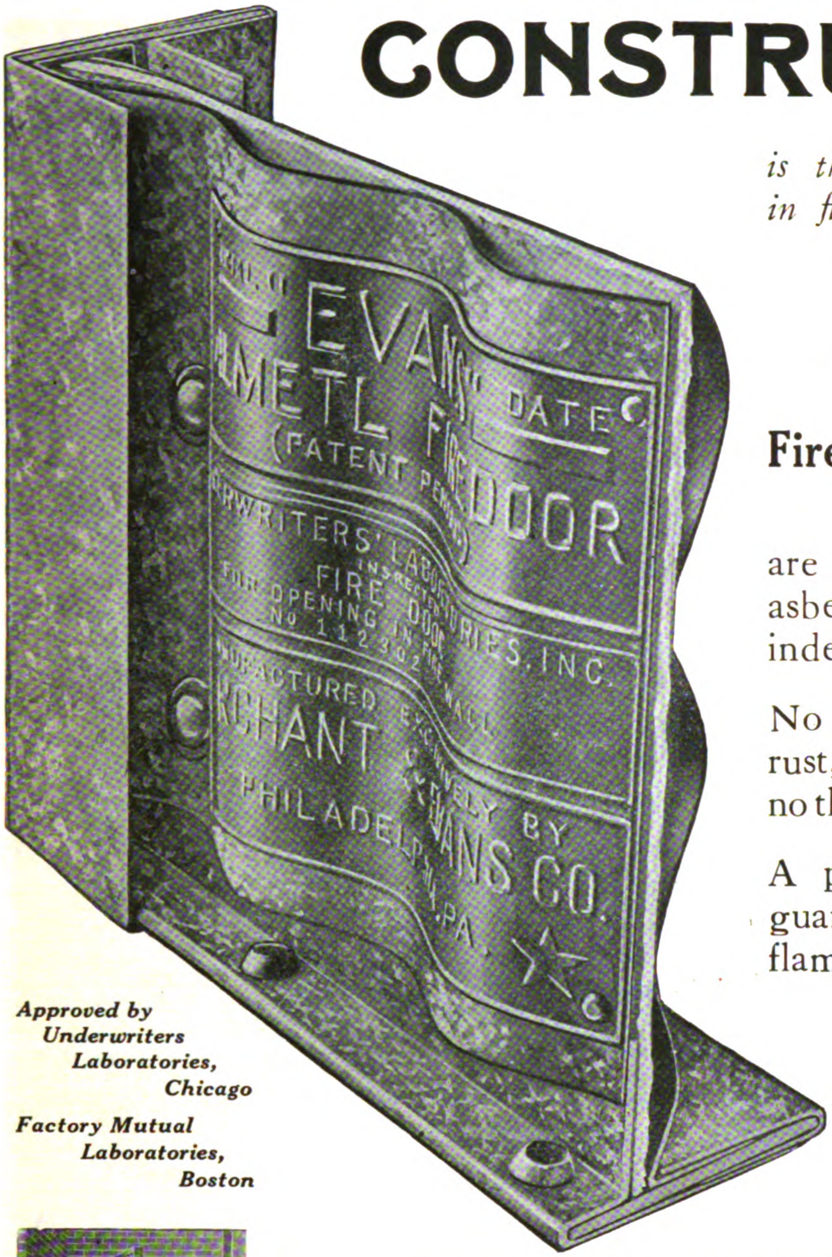
¶ In establishing this complete reference service, manufacturers and others producing catalogs, house organs, price lists, etc., are requested to forward their printed matter and samples and place CONSTRVCTION on their permanent mailing lists.

¶ The FIREPROOFING INFORMATION BUREAU is intended for the use of resident and visiting architects, engineers, contractors and the general business and professional firesafe building fraternity, as well as prospective building owners, to whom its use will be extended gratuitously.

¶ Every effort will be made to develop and maintain this Bureau to a high point of efficiency.

¶ Prompt coöperation is solicited.

"CONSTRVCTION" 1457 BROADWAY New York City



CONSTRUCTION

is the essential requirement in fire prevention appliances

EVANS
"ALMETL"

Fire Doors and Shutters

Patents Pending

are of rigid, all-steel and asbestos, non-warping, and indestructible construction.

No wood to rot, no tin to rust, no seams to open and no thin tin covering to bruise.

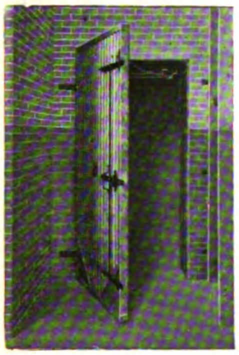
A permanent and efficient guard against the spread of flames.

Approved by Underwriters Laboratories, Chicago

Factory Mutual Laboratories, Boston

Absolutely

the best building opening covering now on the market.



SEND FOR DESCRIPTIVE BOOKLET

Other Fire Prevention Lines

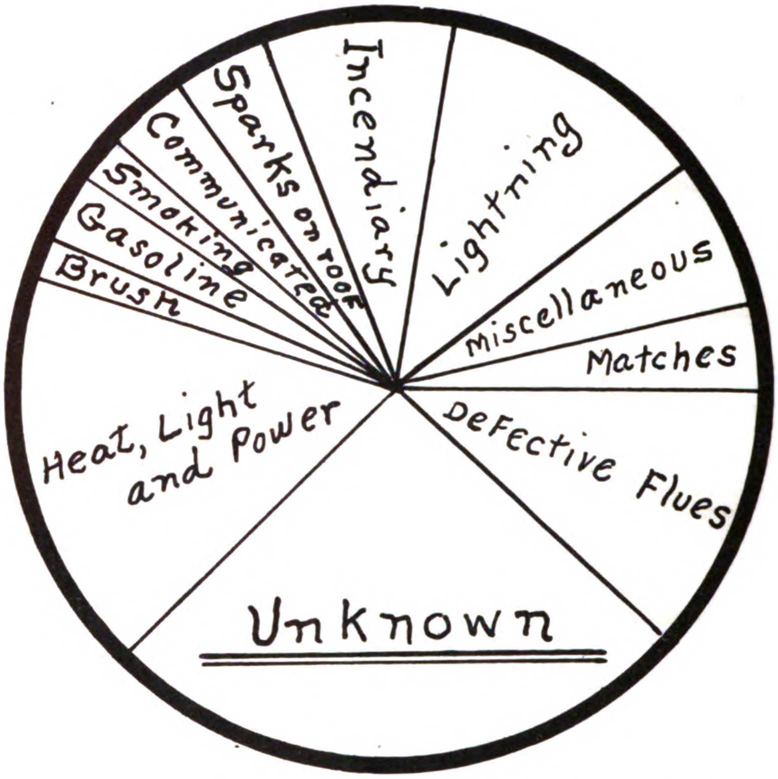
Fire Retarding "Star" Ventilators
Merchant's Metal "Gothic" Shingles
Merchant's Metal "Spanish" Tiles
"Merchant's Old Method" Roofing Tin

1866—MERCHANT & EVANS COMPANY—1916

PHILADELPHIA

NEW YORK *BALTIMORE* *ATLANTA* *CLEVELAND*
WHEELING *CHICAGO* *ST. LOUIS* *KANSAS CITY*

"Fires of Unknown Origin"



The above graphic chart illustrates the ratio of destruction by fires of unknown origin to the total amount of fires in the State of Wisconsin during the year ending June 30th, 1915, as shown by the report of the State Fire Marshal. In this State the recorded destruction by fire for the year was $4,364,195, of which $1,001,455 was caused by fires of unknown origin.

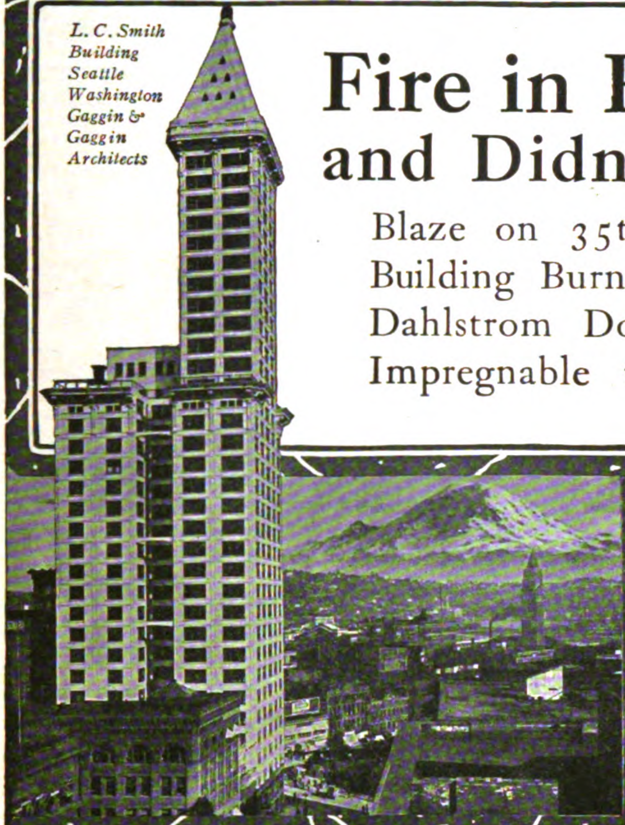
–Impossible When "Aero" is Installed

AERO AUTOMATIC FIRE ALARM SYSTEM discovers a fire in its incipiency and promptly sends out the alarm. Gives warning before the fire gets beyond control; summons help, when help is most needed, in the first stages of a fire—when it can be extinguished before serious damage has been done.

Investigate "Aero" Fire Protection. It is the most efficient least costly method you can install.

AERO FIRE ALARM COMPANY

Havemeyer Building, 26 Cortlandt Street, New York



L. C. Smith Building Seattle Washington Gaggin & Gaggin Architects

Fire in Pipe Shaft and Didn't Know It

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.

Door Finish Only Damage Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.

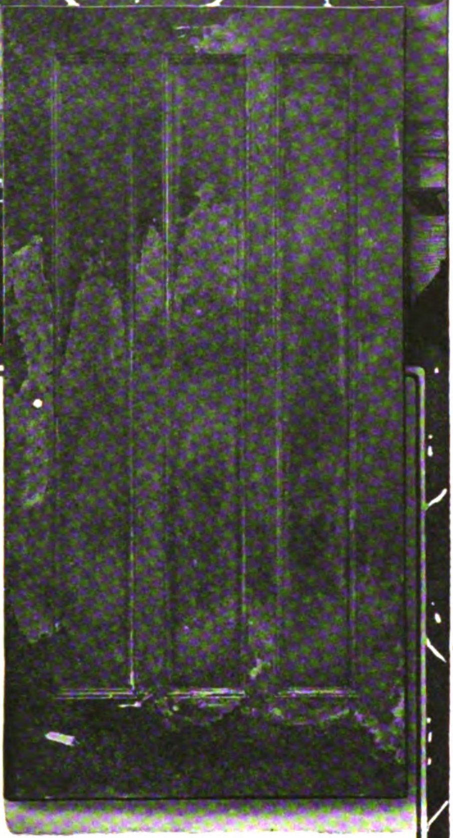
The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.

Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire. Your responsibility ends with the installation.

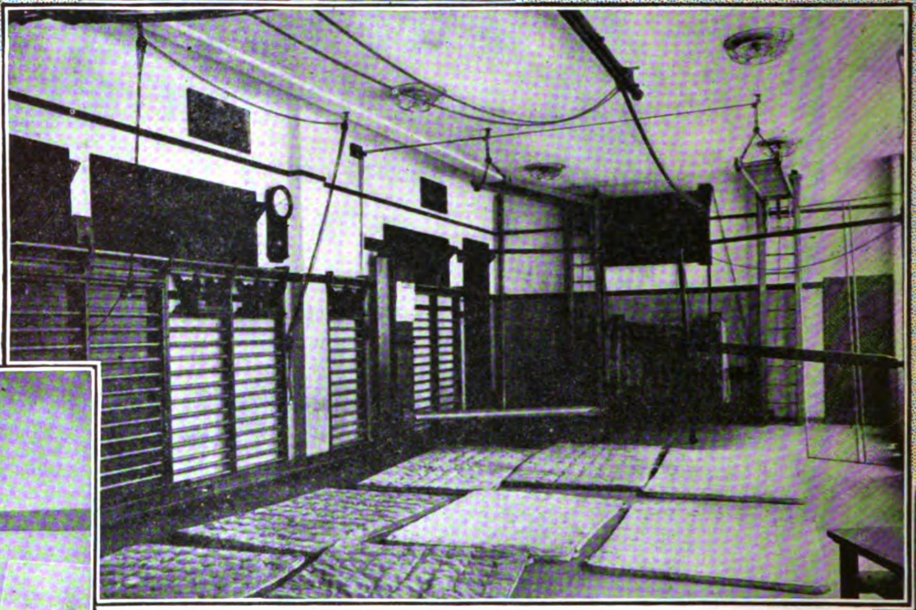
Write for all the facts.

DAHLSTROM PATENT DOOR ARTISTIC EVERLASTING SANITARY AND FIREPROOF

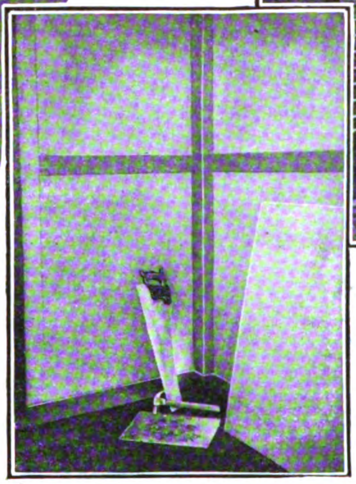
THE DAHLSTROM METALLIC DOOR CO.
Executive Office and Plant, 61 Blackstone Ave., Jamestown, N. Y.
New York Office, 130 East 15th Street



Where there's no fuel there can't be fire



Ambler Asbestos Building Lumber. Used for Interior work in Gymnasium, Washington Irving High School, New York City.



Great fire disasters in schools, theatres, churches or factories dot the history of the past like red horrors. Don't run the risk of any of the buildings in which you are interested being one of the number. Most of those fires originated in the interior of the buildings, starting from some trifling cause—a carelessly dropped match, an "extinguished" cigarette, old worn insulation. Most of these fires could have been prevented or controlled if the interior work had been constructed of

For Fireproof Ceilings, Walls, Stairways, Wainscoting, Partitions, Shafts, and Isolation of Electrical Apparatus.

Ambler Asbestos Building Lumber

NOTHING TO BURN

For Ambler Asbestos Lumber cannot take fire or communicate fire under any conditions. It is made of Portland Cement, reinforced with Asbestos Fibre—two absolutely non-combustible materials. It practically lasts forever without any attention whatever.

Anything that can be made of lumber can be made of Ambler Asbestos Building Lumber. It can be sawed, drilled or screwed. The natural gray color is pleasing and permanent; painting as a preservative is unnecessary, but when desired it can be painted and grained, and takes a good finish.

Let us send you our booklets showing Ambler Asbestos Products in actual service. Samples, too, if you wish. They solve the fireproof problem—for interior and exterior.

KEASBEY & MATTISON COMPANY

Dept. B-3. AMBLER, PA., U. S. A.

Manufacturers of

ASBESTOS SHINGLES, BUILDING LUMBER, CORRUGATED SHEATHING, PIPE AND BOILER COVERINGS

B-3

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Pipe and Boiler Coverings, Paper, Etc ....

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....

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. III DECEMBER, 1916 No. 6

The Palatial Fire-Traps of America

By C. Stanley Taylor

UNBELIEVABLE, perhaps, but true, is the statement that those who can best afford to build and equip their homes properly from the standpoint of safety against fire are the least inclined to do so.

A large percentage of the beautiful homes of America are built to burn, *and do burn!*

It seems almost paradoxical that those who are possessed of the greatest treasure of art and architecture should be the most blind to the danger of loss by fire; while at the same time they are most concerned about the burglary hazard and the proper maintenance of the aesthetic qualities of the surrounding landscape.

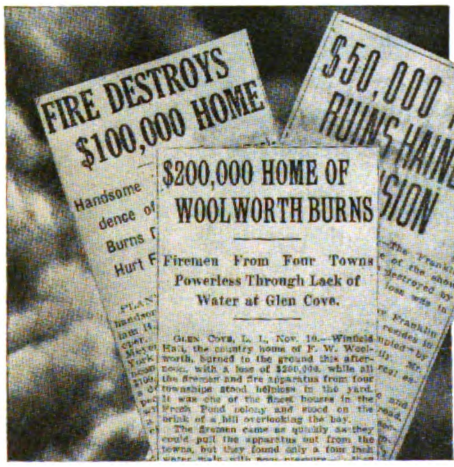
Fire the Supreme Vandal

Invariably it will be found that in homes of culture and of wealth, which have been destroyed by fire, every precaution was taken to install vaults, burglar alarms and watchman service to guard the valuable contents, only to court certain and total destruction by fire—the Supreme Vandal!

Accompanying this article will be found a partial list of palatial homes and country clubs which have been destroyed by fire within the past few years. If the treasures of age and art which were completely destroyed in the burning of these splendid buildings had been the booty of a series of daring thefts, a nation-wide sensation would have been the result and the owners and occupants of similar dwellings would live in constant terror as possible victims until the daring gang had been "rounded up." Additional precautions would be taken to guard against further losses; the police force of half the country would be actively searching for clues leading to the capture of the criminals, and the final result would be a cessation of the losses.

Why?

Why, then, do we sit passively by and watch as one after another the homes of wealth and the homes of the people go up in smoke? Why do we shrug our shoulders at such items in the newspapers and pass on to an exposition of why the cost of living is bounding upward? Why do we continue to build of inflammable materials, to neglect the proper protection of building contents by the installation of available safeguards against fire and its spread; to maintain deficient water supply systems; to roof our homes with kindling wood



FIRE DESTROYS $100,000 HOME

Handsome
dence of
Burns
Hurt F

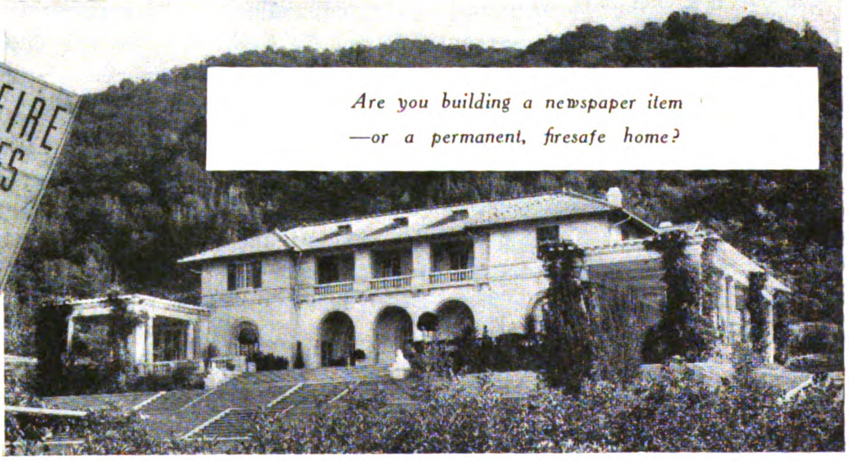
$50,000 FIRE RUINS HAINES
SION

$200,000 HOME OF WOOLWORTH BURNS

Firemen From Four Towns Powerless Through Lack of Water at Glen Cove.

GLEN COVE, L. I., Nov. 10.—Winfield Hall, the country home of F. W. Woolworth, burned to the ground this afternoon, with a loss of $200,000, while all the firemen and fire apparatus from four townships stood helpless in the yard. It was one of the finest houses in the Fresh Pond colony and stood on the brink of a hill overlooking the bay.

The firemen came as quickly as they could pull the apparatus out from the towns, but they found only a four inch



Are you building a newspaper item
—or a permanent, firesafe home?

in the form of shingles? Why is the fire loss accepted as part of our national life?

Burning in the Lesson

It is strange that men of affairs, men whose ability to conduct their own business in such a manner as to produce or increase immense fortunes—men whose far-sightedness and keen business vision are kept constantly directed toward the proper turning in the deviating paths of modern business, should be so short-sighted and careless in the planning and maintenance of a home.

Take for example the metropolitan business districts, where in great office buildings precautions against fire losses have become the object of careful consideration and enforcement by the very men whose homes have furnished, or *are about to furnish,* interesting news items when their complete destruction by fire is recorded!

The photograph herewith is representative of the type of suburban residence, which as a rule is situated at a remote distance from proper fire extinguishing apparatus. This home is located at Greenwich, Conn., and the owner, who has the right idea with regard to the proper protection of his family and home, has installed an efficient automatic fire alarm (compensating pneumatic type), which will give him immediate notification in his bed-room of the slightest outbreak of fire, by the ringing of a small gong.

Further, there is situated in the main hall of the house a large ten-inch gong, which can be heard from all parts, and the switchboard containing the apparatus and annunciator is conveniently located in the hall within close proximity of the bed-room. The system is divided into ten fire areas, with each floor covered by two separate circuits, north and south. Notification is also relayed to the stable and garage, where plenty of help is available to assist in controlling any outbreak.

Working in conjunction with this automatic notification a standpipe chemical system has been installed, with hose stations conveniently located on the several floors.

Do these men build to burn again? Sometimes, but not often! When the lesson of properly safeguarding the home against fire is *burned in* it is usually well learned!

Very recently the writer sat in the library of a beautiful Long Island country home, comfortably discussing over coffee and cigars the interesting question of national defense and preparedness. During the discussion the daughter of the household came in and outlined a very definite program of instruction in driving one of the new cars, asked for and received a check to cover the cost of the lessons.

After she had gone out the cost of lessons was the subject of a one-sided and rather heated discussion.

"Automobile lessons! French lessons! Music lessons! Dancing lessons! I am spending a fortune on lessons—every day brings something new!" Her father was warming up to the subject.

"Yes," I said. "And do you realize that some time—perhaps to-morrow, perhaps next year—you are going to pay out about $100,000 in real money, together with considerable regret and perhaps sorrow, for *one* lesson for *yourself?*

He laughed.

"What are you starting—a preachment against the evils of playing the market?"

"No; against the unsound business policy of most of you men of large affairs when it comes to the building and maintenance of a beautiful home—against your absolutely criminal negligence in the matter of the fire hazard. Suppose that John (the butler) should come in this moment and say something like this, 'Excuse me, sir. The large barn is on fire, sir!' what would you do?"

He thought a moment, then said:

"I suppose I would telephone down to the village for the fire department and do what we could here until they came. Then—[a happy thought]—next week we would collect the insurance and build a new barn." Thus it was settled in his mind.

But his reasoning was rudely disturbed.

"Have you a good fire department?" I asked.

"Yes, a fine one. I subscribe every year to help keep it up."

"Have you a good water supply here?"

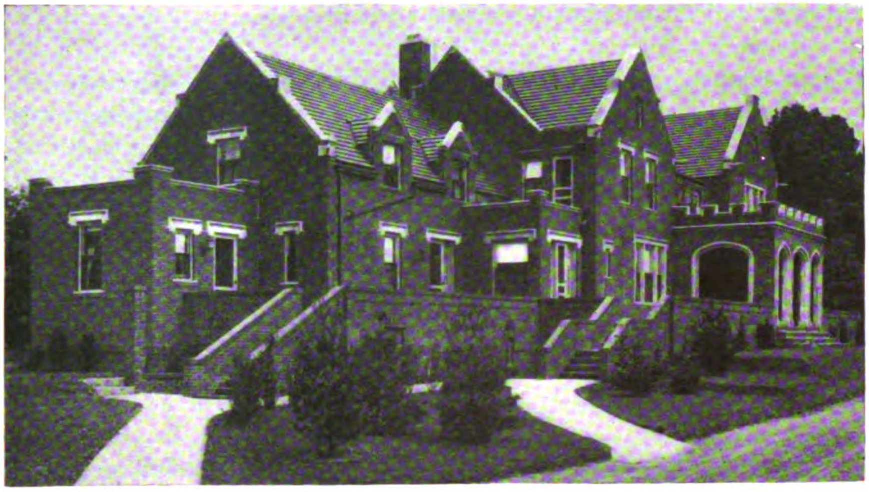
"Hm!" reflectively. "I don't know."

"Have you any alarm system or extinguishing devices in the barn?"

"None, except the regular call bell."

The Home of Mr. Arthur Williams at Glen Cove, L. I.

This is a splendid example of common-sense firesafe home-building. Note masonry exterior and firesafe roof.



"In the house?"

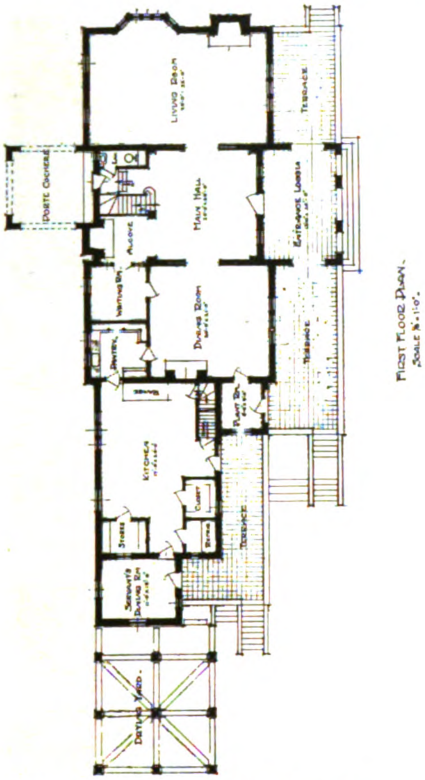
"No, I have never gotten around to that."

"Did you ever give much thought to the matter of the fire hazard?"

"Not much, except to cover everything with insurance."

A strong wind was blowing outside and, directing his attention to it, I said:

"Now, let me tell *you* what would happen. The barn is only about 200 feet away, and by the time the fire was discovered, having no proper alarm system, it would have gained headway, which would increase until the fire department could travel four miles.



First Floor Plan of Williams House

"The wind is blowing now from the direction of the barn to this house. We have had no rain in two weeks. The wood shingles on the house are dry, and so is the frame exterior. Everywhere there is wood to burn, and the barn will furnish a rain of flying brands to set it on fire. Your fire department will be helpless for want of a proper water supply system and to-morrow's papers would carry a news item to the effect that Shadowland, the beautiful country home of ——— ————, millionaire banker, was burned to the ground while its owner watched the destruction.

Insurance?

"Insurance? Certainly, and a good thing for you. But can you ever replace many of the beautiful things you have here? Will the insurance pay for everything—for the disturbance and the indirect loss, and the possible loss of life. And do you realize that by a

A Few Losses in the "Jumbo" Class

T. H. Farr, West Orange, N. J.	$60,000
Robert Bacon, Westbury, L. I.	250,000
R. M. Clark, Pomfret, Conn.	50,000
L. A. DeBary, Madison, N. J.	175,000
J. E. Ingram, Baltimore, Md.	80,000
Simon Perkins, Sharon, Pa.	125,000
Pratt Homestead, Glen Cove, L. I.	50,000
Centro Asturiano Club, Tampa, Fla.	90,000
Mrs. M. W. Horgan, Deal Beach, N. J.	70,000
Summer cottages at Narragansett, R. I.	75,000
Thomas Hastings, Wheatley Hills, N. J.	125,000
St. Charles Country Club, Winnipeg, Man.	250,000
Frank Dickerson, Great Neck, L. I.	100,000
Robert D. Brewster, Mt. Kisco, N. Y.	300,000
Henry P. Davison, Glen Cove, N. Y.	125,000
Adirondack League Club, Little Moose, N. Y.	75,000
Theodore P. Shonts, Daphne, Ala.	100,000
Mrs. Wm. K. Vanderbilt, Jr., Jericho, L. I.	500,000
Mrs. Jas. Jessica Taylor, Cedarhurst, L. I.	600,000
Paul D. Cravath, Locust Valley, L. I.	500,000
Raymond E. Bayliss, Huntington, L. I.	50,000
Stephen H. Burgoyne, Great Neck, L. I.	100,000
A. R. Chapman, Great Neck, L. I.	70,000
Mrs. P. F. Collier, Southampton, L. I.	50,000
Wm. H. Moffitt, Plandome, L. I.	100,000
Franklin Haines Homestead, Yonkers, N. Y.	50,000
F. A. Woolworth, Glen Cove, L. I.	250,000

little study and for an amount of money small to you, you can render this hazard a great deal less?"

The discussion was continued with increasing interest, and to-day that man is making a careful study of his home with a view to its proper protection against the rapid spread of flames.

Risks Disliked by Insurance Companies

One of the best proofs of the existence of such improper and unsafe conditions in homes of wealth is the attitude of the insurance companies toward these so-called "jumbo" risks.

Within the past few years the companies have had to pay out millions of dollars to owners of palatial residences, and the question of still further increasing the rates above those provided by the use of a schedule is receiving serious consideration. It is but natural that this class of risk should be limited, and the severe losses in so many units of the class have created a loss ratio which must result in the increase of rates to probably as high as 70 cents per hundred dollars.

Attractive and Sensible Design of Garage on Property of Mr. Arthur Williams at Glen Cove, L. I.

Common-Sense Protection

It is not the purpose of this article to go into the details of firesafe construction and equipment in this class of buildings. In later issues of CONSTRVCTION these details will be carefully considered.

However, it would seem well to point out the possibilities and opportunities offered to owners and prospective owners in the matter of safety against fire.

In the first place, there is no longer an excuse for building with frame exteriors and wood shingle roofs. Face brick in attractive patterns, cement in the form of delicately colored and finished stucco or reinforced concrete and various patented forms of hollow tile and cement blocks offer an infinite variety of attractive and unburnable exteriors.

Sensible Roofing is Obtainable

Roofs, too, may be artistic and still present a barricade against flying sparks and brands. Many varieties of attractive firesafe shingles are on the market to-day. Asbestos cement, terra cotta and slate may be had in delicate shades and colorings. Shingles of steel and copper, tin roofing, asphalt shingles and many other types which combine safety, permanency and beauty are available.

For the interior of the house wood in its many forms and colorings will always be used, but partitions and floors may be of unburnable material and all stairways enclosed for protection. Particular care may be taken in the construction and lining of chimneys and flues and in the electrical equipment, for these are two prolific sources of fires.

Automatic Protection is Necessary

The danger spots—kitchen, cellars, storerooms and attic—may be protected by automatic sprinklers, either of the water or chemical type. Efficient fire alarm systems should be installed throughout the house and outbuildings and a proper equipment of fire house and chemical extinguishers, both of the small hand and large wheel tank type, provided.

The Remarkable Development of Record Protection

Realizing that, though a building may be built of unburnable materials and carefully equipped with protective devices, valuable records and documents must be properly safeguarded against fire, CONSTRVCTION will publish from time to time data, tests, fire losses and other information which will record the remarkable progress being made in the art of designing and fabricating firesafe record containers. The present article outlines an interesting series of tests made at the factory of one of the large manufacturers in this line, and the data and figures in this articles were supplied by the manufacturer.

Such efforts on the part of manufacturers are of national benefit, in that they help to direct the public toward the proper protection from fire of valuable articles.

THE question of comparative fire resistance offered by various types of the solid wall and the sheet steel insulated safes has for the past year been engaging the attention of the officials of many of the large corporations.

While some manufacturers of the sheet steel variety of safes have sought ratings by the Underwriters' Laboratories, no data is as yet available as to the solid wall type. The following report should prove of interest to those having to do with the subject of record protection.

The equipment for these tests includes the fire-testing furnace with related equipment, and the precipitation and impact tower. The furnace is used, of course, for testing an article for heat and fire resistance, while the tower determines the fall and impact resistance.

These tests were carried out with the idea of approximating conditions through which a safe would pass in a very severe building fire. The heat test was made to equal the intensity of heat in an actual fire and the dropping test followed by falling brick and broken concrete simulated the collapse of floor or building.

Measuring Temperatures

Temperature readings are taken by means of electro-therma couples, connected with a galvanometer. Some of the thermo-couples (in tube form) are inserted into the flames, and others are placed inside the article tested. Thus it is possible, by using a many-point switchboard, to get accurate data every moment, while the test is under way, of all temperatures developed both in the flames and inside of the test sample.

Arrangements for Precipitating Test

The tower is in the form of a derrick, about forty (40) feet high over all. The platform from which the article tested is hurled is exactly thirty (30) feet from the ground floor. An elevator makes it possible to convey a red-hot safe to the platform with sufficient dispatch to insure its precipitation while still hot. On either side of the platform is a large hopper filled with brick, stone or other heavy debris. By means of trip gates this miscellany of material, weighing approximately a ton, is released and permitted to drop squarely on the safe immediately after the fall.

The first series of tests, conducted in February of this year, had to do with the medium wall type of iron safe and the sheet steel filing safe of a type bearing the Underwriters' Laboratories label "Light Weight Safe." Four specimens were tested.

Test of Subject "A"

Solid Wall Safe

This specimen is commercially known as a "fireproof safe," with inside dimensions 28 inches high by 20 inches wide by 14½ inches deep; walls 3½ inches in thickness. Equipped with a single door and combination lock. This was an old and practically obsolete type of safe.

Thermo-couples were employed at two points in the furnace No. 1 and No. 2. Interior couple is shown as No. 3.

Minutes	*Couple No. 1* *Exterior Heat*	*Couple No. 2* *Exterior Heat*	*Couple No. 3* *Interior Heat*
1	860	390	
2	1110	620	
3	1190	770	
4	1240	890	
5	1275	980	
6	1300	1040	
7	1330	1080	100
8	1350	1120	135
9	1370	1150	160
10	1380	1160	173
11	1400	1190	185
12	1410	1200	190
13	1425	1215	195
14	1430	1225	197
15	1440	1235	200
16	1450	1250	200
17	1460	1275	200
18	1465	1290	200
19	1475	1300	200
20	1495	1320	200
25	1580	1510	210
30	1615	1560	215
35	1660	1625	218
40	1690	1670	227
45	1710	1700	245
50	1720	1710	255
55	1725	1730	272
59	1700 gas off	1705 gas off	282
60			285
61			287
62			292
63			297
64			302

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The readings in the foregoing test show that 302 degrees Fahr., the potential danger point of papers, was reached in sixty-four minutes after the gas was turned on. The maximum temperature at such period being computed at approximately 1,700 degrees Fahr. This specimen was about eight years old. Contents intact.

Tests of Subject "B"

Insulated Sheet Steel Filing Safe With Single Door

Thickness of walls 3½ inches—bears Underwriters' Label, "Light Weight Safe." Interior measurements 30 inches high by 20 inches wide by 15 inches deep—approximately almost exactly those of speciman "A". Thickness of wall 3½ inches.

Minutes	*Plat Couple No. 1 Exterior Heat*	*Plat Couple No. 2 Exterior Heat*	*Const. Couple No. 3 Interior Heat*
1	140	460	
2		760	
3	1125	955	
4	1210	1115	
5	1215	1225	
6	1225	1300	
7	1235	1355	
8	1245	1395	
9	1280	1420	
10	1280	1425	
11	1290	1430	
12	1310	1435	108
13	1315	1445	125
14	1335	1460	145
15	1340	1475	162
16	1350	1495	173
17	1375	1520	182
18	1395	1540	190
19	1415	1545	195
20	1430	1550	200
25	1555	1650	212
30	1560	1600	215
35	1575	1610	215
40	1595	1620	215
45	1630	1630	215
50	1630	1630	215
55	1685	1700	215
60	1700	1710	215
65	1705	1730	220
70	1720	1755	228
75	1775	1820	233
80	1775	1825	240
85	1790	1840	250
90	1800	1855	263
95	1810	1865	273
96			275
97			276
98			278
99	1810 gas off	1890 gas off	282
100			285
101			287
102			288
103			290
104			293
105			297
106			300

From the above it is seen that 300 degrees Fahr. was reached on the interior after 106 minutes of firing, and that the maximum heat applied at this time was 1,890 degrees Fahr., with contents intact.

Tests of Subject "C"

Solid Wall Safe—With Double Doors

The subject was about two years old. Interior dimensions 25½ inches high by 31 15/16 inches wide by 22 inches deep. Walls of 3½ inches thickness.

The safe was first given a drop of 30 feet while cold and then about 1,000 pounds of broken brick and cement were dropped on it from the tower platform, following which it was placed in the furnace and the gas turned on.

Minutes	*Couple No. 1 Exterior Heat*	*Couple No. 2 Exterior Heat*	*Couple No. 3 Interior Heat*
1	525	325	
2	820	730	
3	860	995	
4	910	1135	
5	1045	1250	
6	1110	1330	
7	1145	1395	
8	1160	1400	120
9	1195	1475	165
10	1210	1495	200
11	1190	1515	223
12	1240	1530	232
13	1240	1540	232
14	1300	1550	232
15	1310	1555	232
16	1330	1565	232
17	1375	1570	232
18	1390	1575	232
19	1390	1580	232
20	1380	1590	232
25	1405	1625	232
30	1450	1645	238
35	1485	1665	252
40	1510	1680	275
45	1550	1700	310
48	1400	1695	325
51			340

At the end of forty-five minutes of firing it is found that 310 degrees Fahr. had been reached within this specimen, and that the maximum heat applied was then 1,700 degrees Fahr. Papers within at front of safe showed evidence of scorching.

Testing Furnace

Tests of Subject "D"

Insulated Sheet Steel Filing Safe With Double Doors

Thickness of walls 3½ inches. Bears Underwriters' "Light Weight Safe" label. Made to conform in size with specimen "C."

The cold precipitation and falling brick and cement tests were first applied to this specimen, as in the case of its immediate predecessor.

Minutes	*Couple No. 1* *Exterior Heat*	*Couple No. 2* *Exterior Heat*	*Couple No. 3* *Interior Heat*
1	640	380	
2	960	720	
3	1080	1030	
4	1125	1180	
5	1160	1295	
6	1180	1375	
7	1220	1430	
8	1250	1465	
9	1265	1485	
10	1280	1500	
11	1300	1510	
12	1310	1520	
13	1315	1530	
14	1330	1535	
15	1335	1540	102
16	1345	1545	110
17	1350	1550	115
18	1360	1555	118
19	1365	1555	120
20	1370	1555	122
25	1405	1580	175
30	1435	1600	205
35	1605	1620	210
40	1650	1650	210
45	1670	1665	210
50	1690	1680	210
55	1730	1690	210
60	1735	1710	210
65	1750	1720	210
70	1765	1730	210
75	1785	1745	218
80	1800	1755	222
85	1805	1750	227
90	1840	1775	233
95	1855	1795	245
100	1875	1800	255
105	1890	1815	265
110	1905 gas off	1835 gas off	278
111			280
112			283
113			286
114			288
115			292
116			295
117			300

After being placed in the furnace the gas was applied for 117 minutes, at which time 300 degrees Fahr. was reached within, and the maximum exterior temperature at such perid is estimated at 1,905 degrees Fahr. Contents intact.

The Value of Proper Protection

The distinct value of proper record protection cannot be overestimated, and the necessity for protecting valuable documents is rapidly being recognized by the American public.

Proper record protection, in the form of firesafe containers, constitutes in itself perfect insurance for otherwise uninsurable and unreplaceable objects. Contracts, deeds, accountings and other papers, which might be termed the very vital centers of business projects, should be so protected against destruction by fire that their loss is impossible.

Almost every great fire, and many small ones, present an unrecorded loss of valuable business documents, and this loss goes a long way to make up the so-called indirect loss which fire-preventionists recognize as being almost as serious as the direct and tangible fire loss. This indirect loss can only be insured against by *prevention,* and prevention means not only the proper construction and equipment of buildings, but the proper safeguarding of valuable records by keeping them in firesafe containers.

The present described tests, and others which will be recorded in CONSTRVCTION from time to time, are the means by which perfect protection for records is being rapidly developed.

Tests Relative to Sheet Steel Safes and Solid Wall Heavy Safe

In November of this year there were conducted a second series of tests to determine the fire resistance of the heavy wall type of safe, and also the fire and shock resistance of an advanced type of light weight sheet steel safe, now awaiting rating by the underwriters. The conditions of these tests were so calculated as to sustain increasing heat conditions for over two hours. Based upon the reports of accepted authorities, the intensity of the heat and its duration in one spot approximated conflagration conditions such as prevailed in the San Francisco and Baltimore fires. The first two tests, however, took no cognizance of building or floor collapse. In the third test this feature was incorporated.

Specimens Tested

The subjects tested were as follows:

"E"—Sheet Steel Safe; double doors; 4-inch walls.

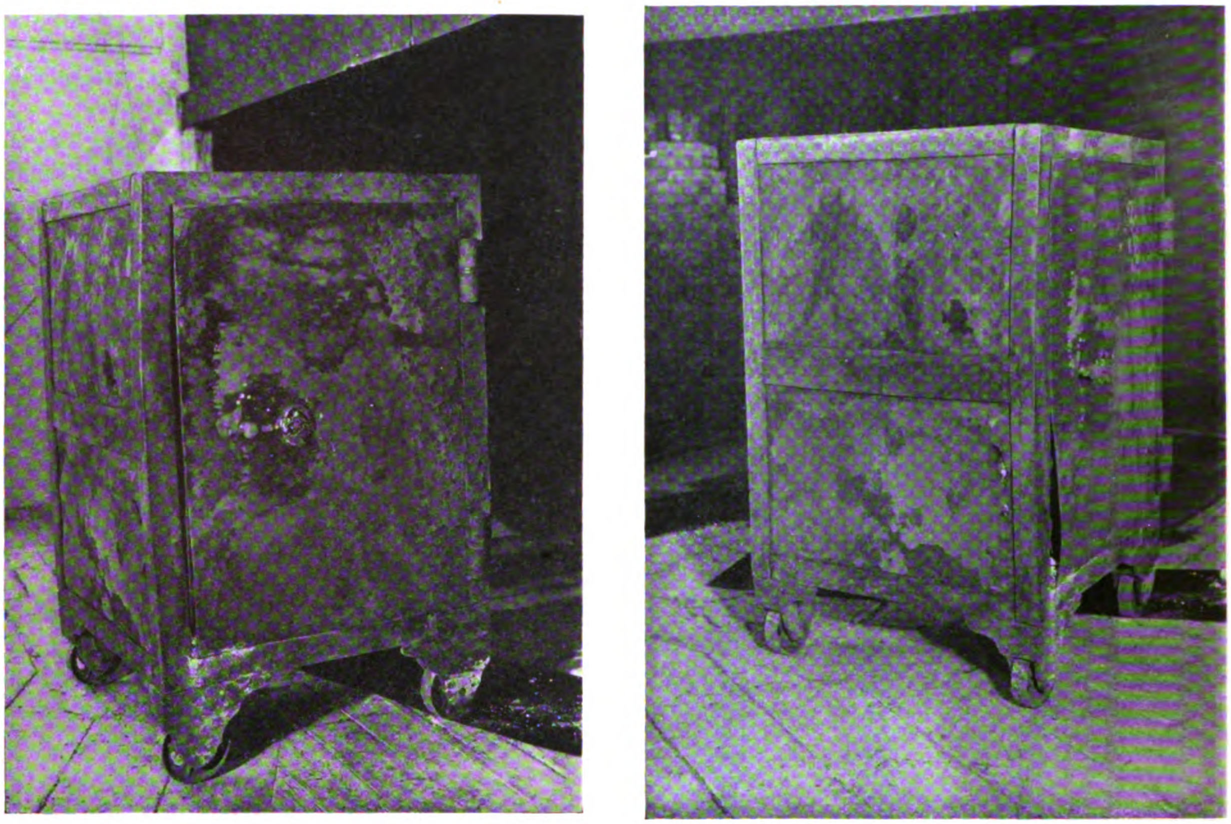
"F"—Iron Safe; heavy type; single door; 6½-inch walls. Straight heat test.

"G"—Sheet Steel Safe; double doors; 4-inch walls. Heat and precipitation test.

TEST "E"

This Sheet Steel Safe is constructed with 4-inch walls, and with interior dimensions 56 inches high by 30 inches wide by 18 inches deep. Besides the additional ½-inch wall thickness over that of the "lightweight safe" model tested in February, this new model is insulated with a new material.

As shown in the pyrometer chart herewith, this Sheet Steel Safe maintained an interior temperature of 300 degrees Fahr. or below for 155 minutes after the turning on of the gas, the maximum temperature at this time being 2,045 degrees Fahr. For



Solid Wall 6½-Inch Iron Safe Following Test F

To Manufacturers of Safes, Steel Cabinets and Filing Devices, and Others Interested in Record Protection

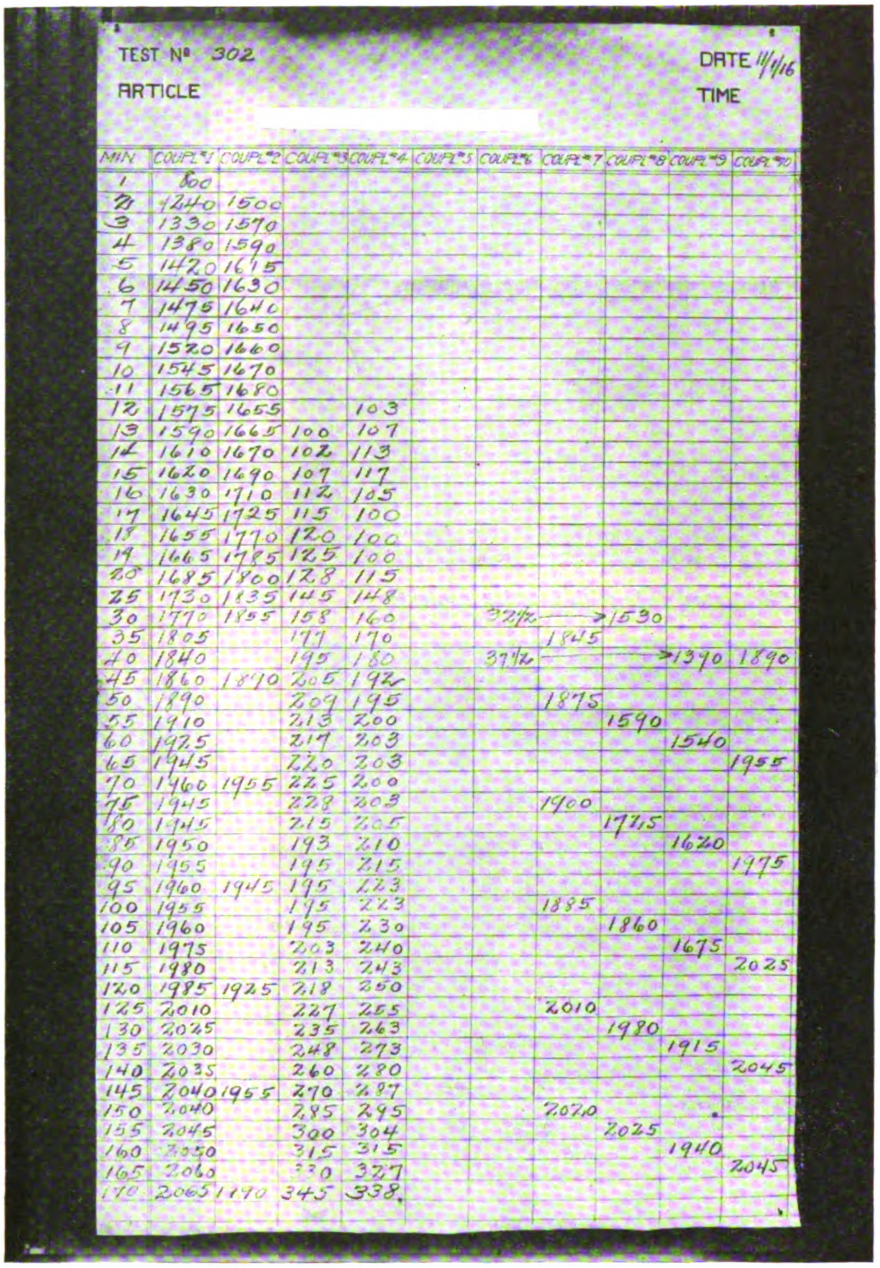
CONSTRVCTION *is making a careful study and analysis of the subject of safeguarding valuable documents against destruction by fire.*

To aid in this work, which should be of distinct value to both manufacturer and public, all manufacturers are requested to keep the editorial department in touch with such efforts as they may be making toward this end.

Any person interested in this subject is invited to correspond with the Editor, and such authentic and substantiated information as may be available will be cheerfully given.

purposes of further investigation the gas was not turned off until a temperature of 345 degrees had been attained within. The subject was then subjected to a stream of water, and the contents found to be intact.

With respect to readings shown on exterior couples Nos. 6, 7, 8, 9, 10 on the chart, it is explained that this procedure varies from the practice as obtained in fixed positions Nos. 1 and 2. Readings at Nos. 6, 7, 8, 9 and 10 were taken with a portable thermocouple, which was transferred from point to point, thus giving a comprehensive survey of interior temperatures at six points within the furnace.



TEST Nº 302

DATE 11/1/16

ARTICLE

TIME

MIN	COUPL #1	COUPL #2	COUPL #3	COUPL #4	COUPL #5	COUPL #6	COUPL #7	COUPL #8	COUPL #9	COUPL #10
1	800									
2	1240	1500								
3	1330	1570								
4	1380	1590								
5	1420	1615								
6	1450	1630								
7	1475	1640								
8	1495	1650								
9	1520	1660								
10	1545	1670								
11	1565	1680								
12	1575	1655		103						
13	1590	1665	100	107						
14	1610	1670	102	113						
15	1620	1690	107	117						
16	1630	1710	112	105						
17	1645	1725	115	100						
18	1655	1770	120	100						
19	1665	1785	125	100						
20	1685	1800	128	115						
25	1730	1835	145	148						
30	1770	1855	158	160		32½ →		1530		
35	1805		177	170			1845			
40	1840		195	180		37½ →			1390	1890
45	1860	1870	205	192						
50	1890		209	195			1875			
55	1910		213	200				1590		
60	1925		217	203					1540	
65	1945		220	203						1955
70	1960	1955	225	200						
75	1945		228	203			1900			
80	1945		215	205				1775		
85	1950		193	210					1620	
90	1955		195	215						1975
95	1960	1945	195	223						
100	1955		195	223			1885			
105	1960		195	230				1860		
110	1975		203	240					1675	
115	1980		213	243						2025
120	1985	1925	218	250						
125	2010		227	255			2010			
130	2025		235	263				1980		
135	2030		248	273					1915	
140	2035		260	280						2045
145	2040	1955	270	287						
150	2040		285	295			2020			
155	2045		300	304				2025		
160	2050		315	315					1940	
165	2060		330	327						2045
170	2065	1170	345	338						

Sheet Steel Safe

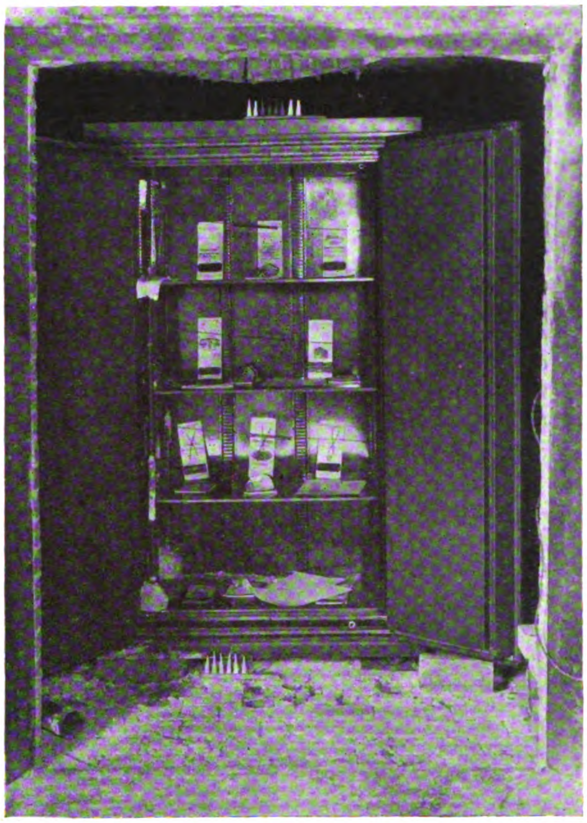
Specimen "E"

STRAIGHT HEAT RUN TEST

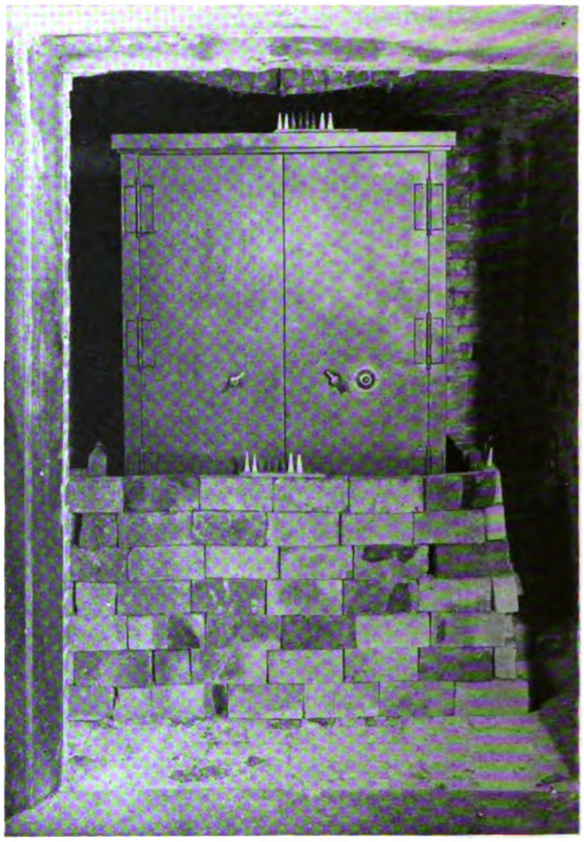
TEST "F"

Heavy Wall Iron Safe—6½" Wall Thickness, Single Door

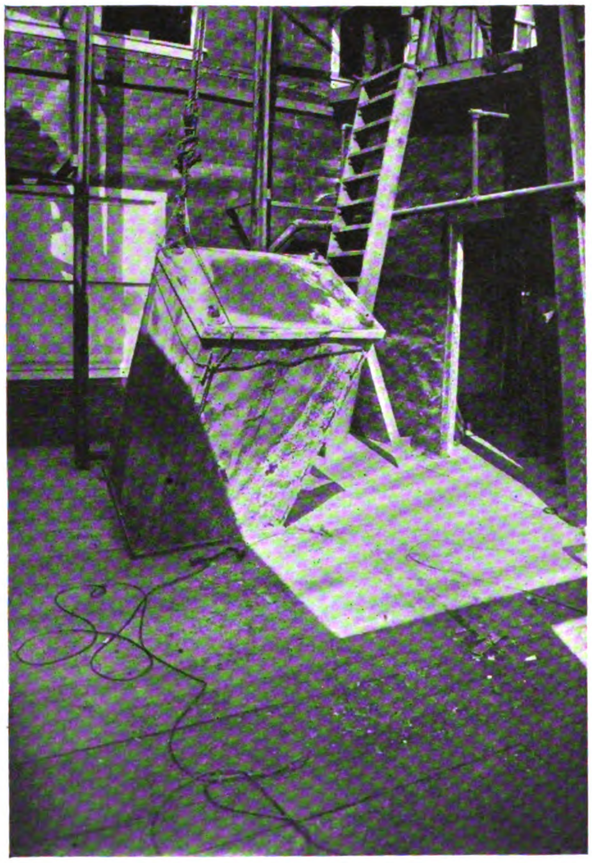
This specimen was constructed of 6½-inch walls and weighed 2,970 pounds. It was a type generally associated with the protection of negotiable papers and securities, as shown by the chrome steel strong chest within. According to best advice, this specimen was about ten years old. As shown in the following log an interior temperature of 300 degrees Fahr. was reached after 155 minutes of firing, the *maximum* temperature at that period being 2,045 degrees Fahr. Fur purposes of further investigation the gas was turned off when a temperature of 351 degrees was



Sheet steel safe with interior contents

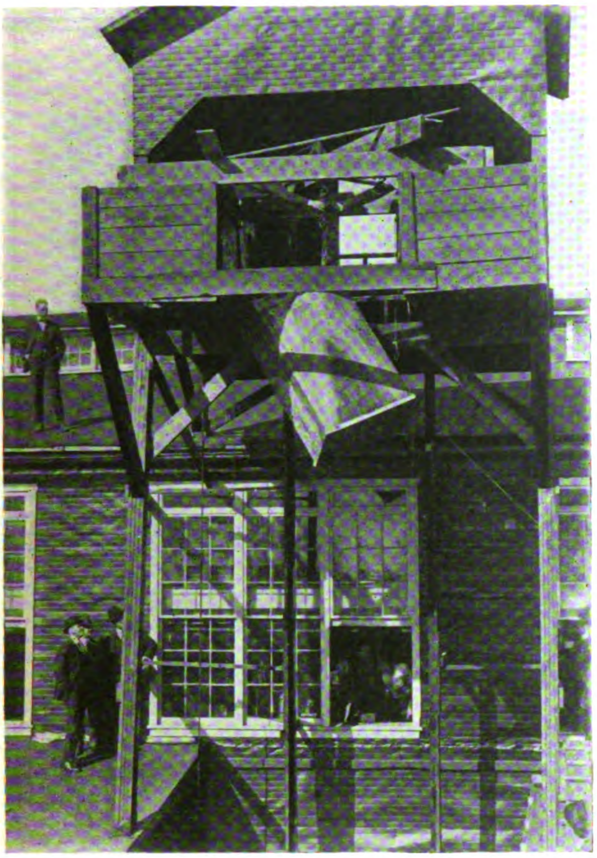


Ready for the firing

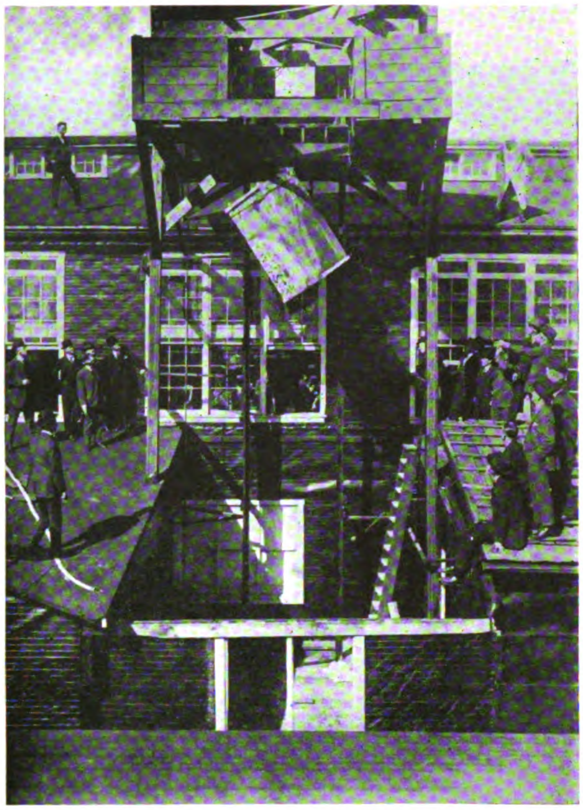


After an hour's firing the specimen was removed from the furnace and bound with steel cable to assure drop on upper left hand front corner

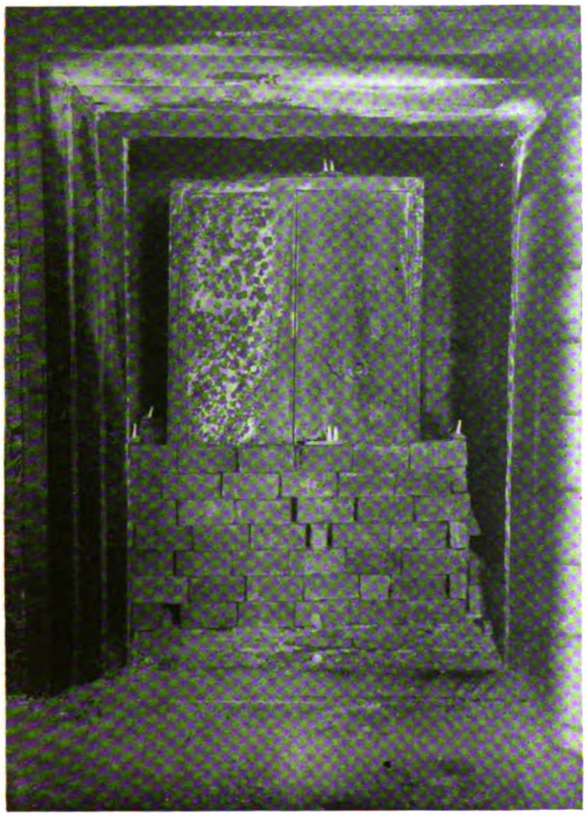
Hoisting to precipitation platform



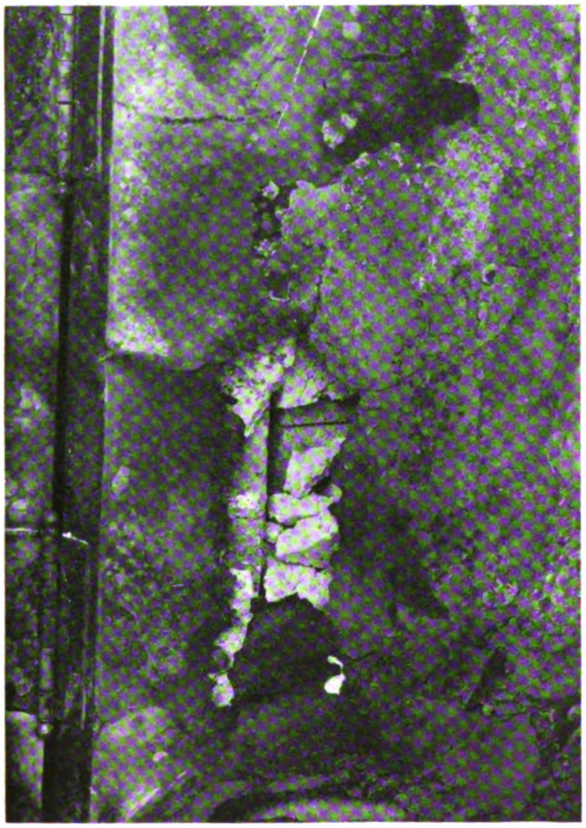
Ready for the drop



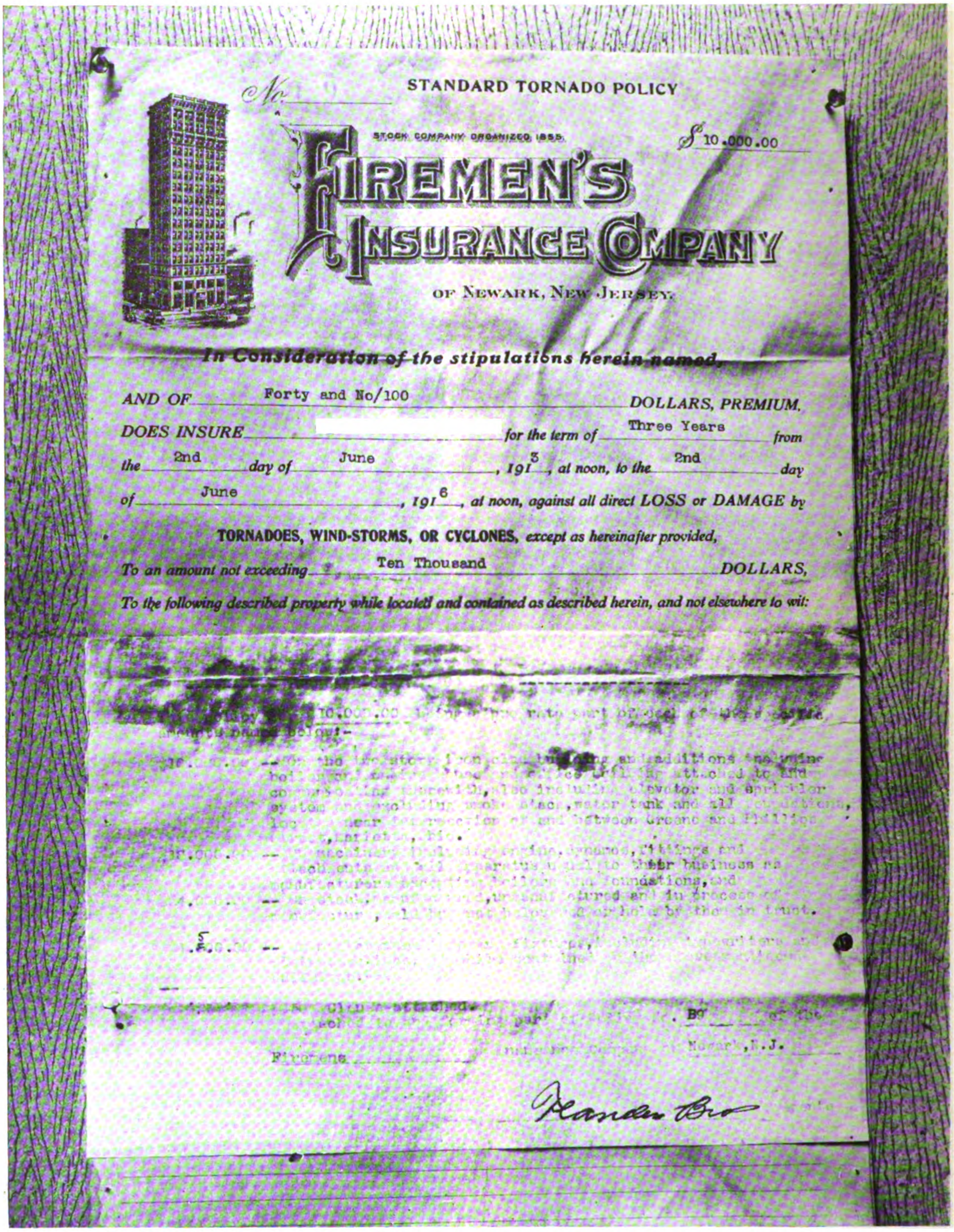
The hemp hoisting rope is cut through



The sheet steel safe ready for the second firing of 105 minutes



Outer sheet steel wall burned through in several places, exposing insulation. Paper contents, however, intact



No.

STANDARD TORNADO POLICY

STOCK COMPANY ORGANIZED 1855.

$10,000.00

FIREMEN'S INSURANCE COMPANY

OF NEWARK, NEW JERSEY.

In Consideration of the stipulations herein named,

AND OF Forty and No/100 *DOLLARS, PREMIUM,*

DOES INSURE [redacted] *for the term of* Three Years *from*

the 2nd *day of* June *, 1913, at noon, to the* 2nd *day*

of June *, 1916, at noon, against all direct LOSS or DAMAGE by*

TORNADOES, WIND-STORMS, OR CYCLONES, *except as hereinafter provided,*

To an amount not exceeding Ten Thousand *DOLLARS,*

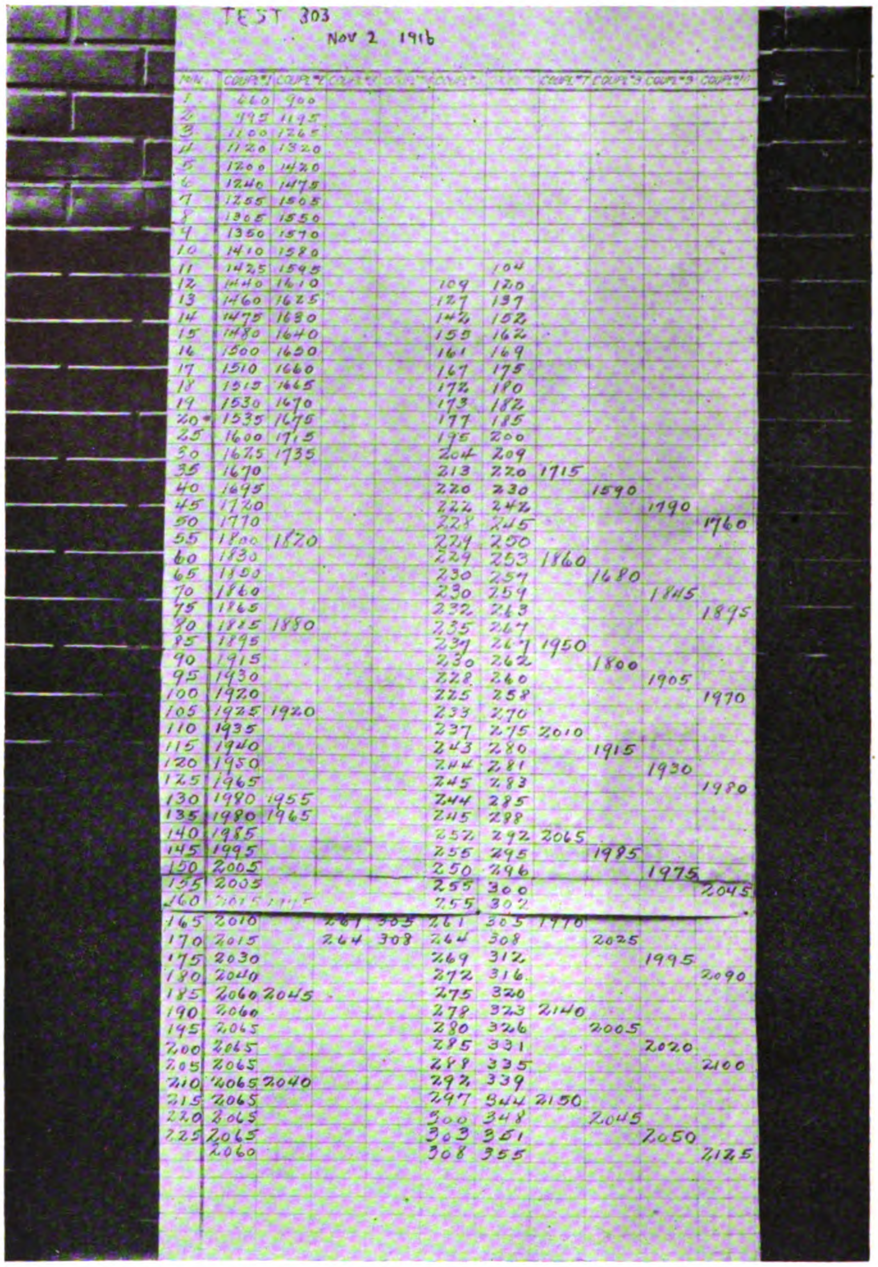
To the following described property while located and contained as described herein, and not elsewhere to wit:

Flanders Bro

Specimen—Opened Document from Sheet Steel Safe in Preceding Test

100%
The Practical Magazine of
EFFICIENT MANAGEMENT
An Idea-Exchange for Executives
APRIL, 1915
Remember When You Bought Your First Adding Machine?
An Even Better Investment Than That First One
Burroughs
A Second Memory—
BAKER-VAWTER COMPANY
Benton Harbor, Michigan
STANDARD TORNADO POLICY.
COMMERCIAL INSURANCE COMPANY
FLANDERS BROTHERS
MARIETTA, OHIO
STANDARD TORNADO POLICY
FIREMEN'S INSURANCE COMPANY
OF
NEWARK, NEW JERSEY
CAPITAL $1,000,000
NEAL BASSETT, MANAGER
WESTERN DEPARTMENT
CHICAGO, ILL.
THE AMERICAN CITY
Everything Changed But the Pipe—
U. S. CAST IRON PIPE AND FOUNDRY CO.
GENERAL OFFICES: BURLINGTON, NEW JERSEY

Group of Specimens Used in Preceding Test arrive at within the subject. Water was then applied, the doors forced open, and the contents found to be intact, though damp from condensation. This after a period of almost four hours.



TEST 303

NOV 2 1916

MIN.	COUPL #1	COUPL #2	COUPL #3	[illegible]	[illegible]	[illegible]	COUPL #7	COUPL #8	COUPL #9	COUPL #10
1	660	900								
2	995	1195								
3	1100	1265								
4	1120	1320								
5	1200	1420								
6	1240	1475								
7	1255	1505								
8	1305	1550								
9	1350	1570								
10	1410	1580								
11	1425	1595				104				
12	1440	1610			109	120				
13	1460	1625			127	137				
14	1475	1630			142	152				
15	1480	1640			155	162				
16	1500	1650			161	169				
17	1510	1660			167	175				
18	1515	1665			172	180				
19	1530	1670			173	182				
20	1535	1675			177	185				
25	1600	1715			195	200				
30	1625	1735			204	209				
35	1670				213	220	1715			
40	1695				220	230		1590		
45	1720				222	242			1790	
50	1770				228	245				1760
55	1800	1820			224	250				
60	1830				229	253	1860			
65	1850				230	257		1680		
70	1860				230	259			1845	
75	1865				232	263				1895
80	1885	1880			235	267				
85	1895				239	267	1950			
90	1915				230	262		1800		
95	1930				228	260			1905	
100	1920				225	258				1970
105	1925	1920			233	270				
110	1935				237	275	2010			
115	1940				243	280		1915		
120	1950				244	281			1930	
125	1965				245	283				1980
130	1980	1955			244	285				
135	1980	1965			245	288				
140	1985				252	292	2065			
145	1995				255	295		1985		
150	2005				250	296			1975	
155	2005				255	300				2045
160	2015	[illegible]			255	302				
165	2010		261	305	261	305	1970			
170	2015		264	308	264	308		2025		
175	2030				269	312			1995	
180	2040				272	316				2090
185	2060	2045			275	320				
190	2060				278	323	2140			
195	2065				280	326		2005		
200	2065				285	331			2020	
205	2065				288	335				2100
210	2065	2040			292	339				
215	2065				297	344	2150			
220	2065				300	348		2045		
225	2065				303	351			2050	
	2060				308	355				2125

Specimen "F"

Solid wall 6½-inch Safe

STRAIGHT HEAT RUN TEST

Test "G"

The specimen utilized in ths test was identical with the Sheet Steel Safe tested in Test "E."

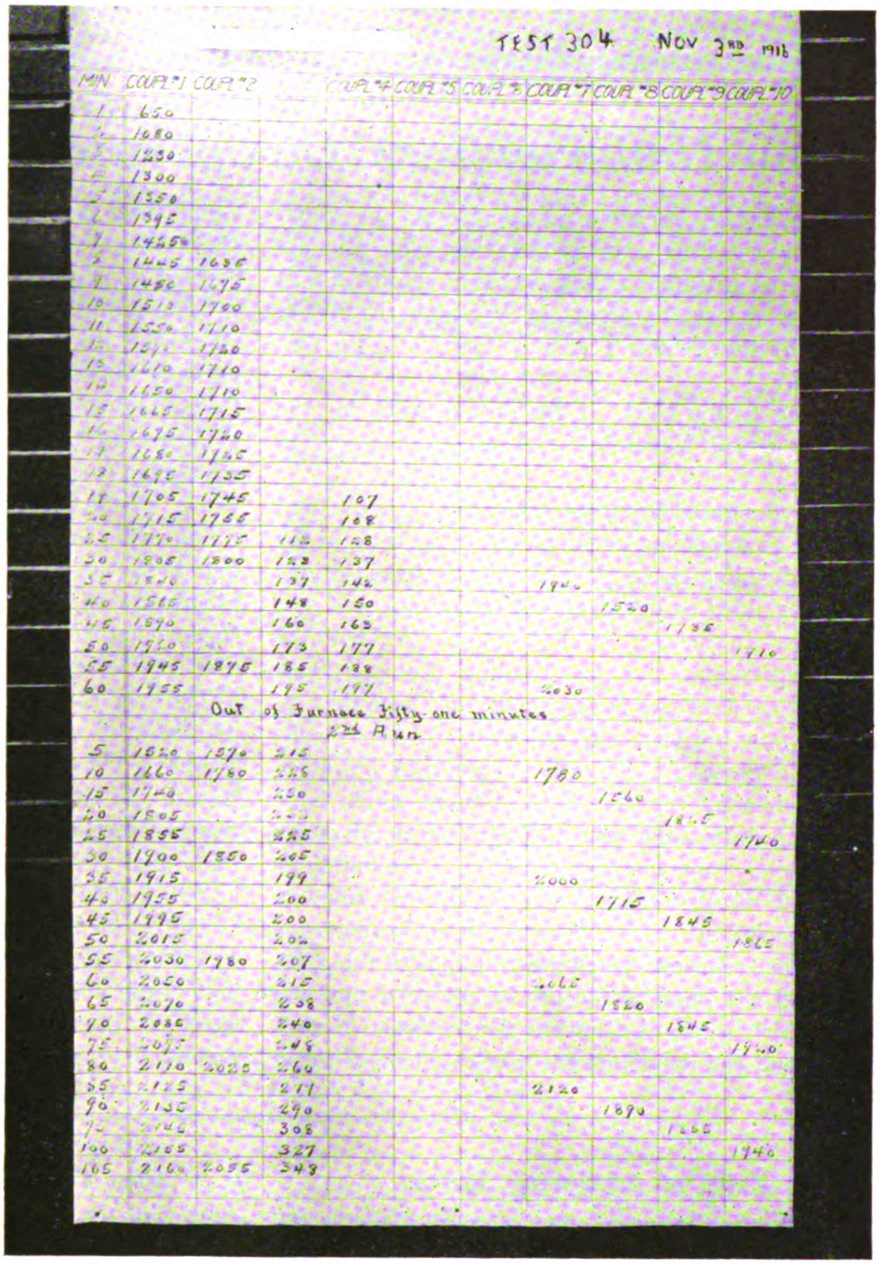
The Sheet Steel Safe was first fired for 60 minutes, the maximum exterior temperature at the end of this period being 2,030 degrees Fahr. and the maximum interior temperature recorded being 197 degrees

The specimen utilized in this test was identical and inverted. Wire cable was tied about it in such a way as to occasion a drop of over 30 feet directly upon the left hand front corner point.

Returned to the furnace, the sheet steel safe was fired for approximately ninety-three minutes before 300 degrees Fahr. was reached on the interior. After 105 minutes it was instantly water-cooled, having been subjected to 2,160 degrees Fahr., with a maximum interior of 348 degrees Fahr.

With respect to the impact resistance of the Sheet Steel Safe, it is to be noted that the total number of minutes during which the specimen in Test "G" was in the furnace is 60 plus 105, equals 165.

Following the dropping of the Sheet Steel Safe the subject showed a slight distortion of the front door and the outer shell, but there was no apparent diminution of its fire resistance, and it is, therefore, doubtful whether its structural integrity was affected by this part of the test. By reason of restrictions in working space and apparatus, and the weight of the 6½-inch wall safe it was not possible to subject this specimen to a precipitation test.



TEST 304 NOV 3RD 1916

MIN	COUPL #1	COUPL #2		COUPL #4	COUPL #5	COUPL #6	COUPL #7	COUPL #8	COUPL #9	COUPL #10
1	650									
2	1080									
3	1230									
4	1300									
5	1350									
6	1395									
7	1425									
8	1445	1635								
9	1480	1675								
10	1510	1700								
11	1550	1710								
12	1570	1720								
13	1610	1710								
14	1650	1710								
15	1665	1715								
16	1675	1720								
17	1680	1725								
18	1695	1735								
19	1705	1745		107						
20	1715	1755		108						
25	1770	1775	112	128						
30	1805	1800	123	137						
35	1840		137	142			1920			
40	1865		148	150				1520		
45	1890		160	163					1736	
50	1920		173	177						1710
55	1945	1875	185	188						
60	1955		195	197			2030			
		Out of Furnace Fifty-one minutes 2nd Run								
5	1520	1570	215							
10	1660	1780	228				1780			
15	1740		230					1560		
20	1805		[illegible]						18[illegible]5	
25	1855		225							1740
30	1900	1850	205							
35	1915		199				2000			
40	1955		200					1715		
45	1995		200						1845	
50	2015		202							1865
55	2030	1780	207							
60	2050		215				2065			
65	2070		238					1820		
70	2085		240						1845	
75	2095		248							1920
80	2110	2025	260							
85	2125		277				2120			
90	2135		290					1890		
95	2145		308						1865	
100	2165		327							1940
165	2160	2055	348							

Specimen "G"

Sheet Steel Safe

HEAT RUN

PRECIPITATION AND HEAT RUN TESTS

The Second National Complete Building Show

GRAND CENTRAL PALACE, *New York City*, MARCH 5 to 11, 1917

300,000 VISITORS

? Ask us about it ?

INSURANCE DEPARTMENT

Edited by GEORGE A. WATSON

How Underwriters Co-operate With Assured

CONCRETE evidence of the manner in which underwriters are co-operating with the assured in safeguarding property against fire is afforded by the recent report of President Frank A. Derwick, of the Boston (Mass.) Board of Fire Underwriters.

Referring to the work of the organization for the fiscal year ended November 1, Mr. Derwick said in part:

"We have rerated fireproof theaters and hotels and have made an important equalization of the rates in the store and dwelling class. We have made specifications for 165 sprinkler equipments and have approved 134 equipments. In this work we have co-operated with the Fire Commissioner and the Building Commissioner of the city, so that the requirements of these departments are now uniform with our own. We have continued to oversee the erection of fireproof buildings and have detailed reports of 82 of these which have been put up during the year. The value, as given by the Assessor's Department of the city, of the buildings of this type which we have supervised, now amounts to more than $96,000,000. We have been so fortunate as not to have a serious fire in the buildings of this type, but, should the occasion occur, I feel sure that the reports which we have showing the methods of construction and the details of the work will be of great value, both in the adjustment of the loss and in the study which should follow such a loss as to the best method of preventing similar losses.

"The sprinklered risk department, as you probably all realize, has now become one of the most important parts of our work. The law allows the Fire Hazard Commissioner to prescribe installations of this form of protection in many buildings, and it has been to our advantage to co-operate in the engineering part of this work. The department has been increased by the addidition of an inspector during the year, and it is likely that if the increase in sprinklered buildings, which is practically 25 per cent of the total number under our supervision at the beginning of the year, continues, it will be necessary to add another man to this force."

The wholesale district of Boston is very congested, and because of a lack of proper public fire-fighting facilities constitutes a serious menace to the city. Because of this fact the equipment of private properties becomes a matter of increased importance, each individual risk safeguarded against fire becoming an added protection against a sweeping conflagration.

The underwriters at Boston have accomplished much during the past year in the way of fire safety, and if the public authorities were equally alive to the situation the possibilities of widespread fires in the community would be materially reduced.

◆

Talks of Advancing Rates

WHILE no definite action with respect to increasing rates upon wooden roof dwellings in the South was taken at the recently held annual gathering of the Southeastern Underwriters' Association (the governing insurance organization of the territory), it is probable that such proceeding will shortly follow.

The frequency of fires from sparks falling upon wood shingle roofs, and the unwillingness of municipal authorities in many of the Southern communities to recognize the peril and legislate against it, is a source of wonderment to the underwriters, who will be forced either to again advance rates upon buildings so exposed or refuse to insure them at all.

Over $210,000,000 Destroyed by Fire

Within the eleven months ended December 1 property valued at over $210,000,000 was destroyed by fire in the United States and Canada.

Poor construction, carelessness and outright criminality are the factors mainly responsible for this appalling waste. State and municipal law-makers must be held primarily to blame for permitting the erection and maintenance of structures of combustible material or so poorly constructed as to foredoom them to destruction by fire and to threaten the safety of the community generally. Until the fact that every fire is a crime is driven home to the people of this country, and our statutes are framed to that end, it is idle to expect any marked diminution in the fire waste.

Rebuilding at Salem, Mass.

A LATE inspection of Salem, Mass., disclosed that 761 permits have been issued for the erection of buildings to replace the 1,500 destroyed in the great conflagration of 1914. "Of the new properties 15 per cent are of brick-walled or superior construction and the remainder of frame; the estimated cost for the restored construction is considerably in excess of the total construction destroyed. Roof coverings on new buildings throughout the city are of incombustible materials as required.

"Northwest of the intersection of the Salem-Peabody line and Boston street, in Peabody, is a moderate width manufacturing district about half a mile long containing tanneries and numerous other leather factories, and intermingling of shingle-roofed frame tenements. Several of the plants are mutually exposing. Construction is mainly one to six-story frame, of small to excessive areas; the maximum height is nine stories. The potential hazard is extremely high. Many of the plants are sprinklered. The town water supply in this section is inadequate. When beyond control of their private protective equipment, and especially where this is lacking, the individual plants are subject to serious fires and heavy losses, and during winds of only moderate velocity are very liable to set up conflagration conditions over a large residential portion of the town and adjacent manufactories. Construction in Salem and Peabody in this vicinity is closely joined and of readily burnable character, but not congested to a marked degree. The probability of a conflagration originating in the described manufacturing district extending into Salem and involving practically all of the residential section to the southeast as far as Goodhue and Proctor streets is very high; on account of considerable open space in this locality, the edge of the burnt district of 1914, it should be prevented from extending further within Salem."

Lessons of a Long Island City Fire

NINE lives were lost in the burning of the Long Island City plant of the Oakes Manufacturing Company on October 17 last.

The buildings were of frame and brick construction, principally the former. The structure destroyed, according to a carefully prepared report of the New York Board of Fire Underwriters, "was 32 feet wide and 184 feet long. It was originally constructed as a one-story building, but was recently raised to two stories; the walls were wood sheathed and covered on the outside with corrugated iron; floors were in part double with one-inch hardwood on rough floor, otherwise two-inch plank, all of joisted construction. The second story was divided into three sections by wood partitions. The first story was an undivided area."

The fire was caused by an explosion of chemicals, and the flames spread so rapidly as to cut off all escape of the office employees, all of whom were killed. The conclusions of the underwriters wth respect to the fire are as here given:

"The tragedy of the loss of these nine lives showed over-confidence to be fully as dangerous as panic. All occupants should leave a building in which fire occurs without delay.

"The fire was occasioned by the overturning of bisulphite of sodium—a chemical not dangerous in itself—into a quantity of chlorate of sodium, a substance well known to be dangerous on account of its capacity for liberating oxygen, and which should have been stored in an outside building in conformity with usual practice regarding chlorates, nitrates and other oxidizing agents.

"The spread of the fire was in large measure due to improper installation of hose on a system without adequate water supply.

"The intelligent and efficient use of well designed fire apparatus in two neighboring plants confined this fire practically to the buildings in which it started, in the midst of a group of large frame buildings, logwood and lumber piles and combustible docks, with a 60-mile gale blowing.

"Public fire-fighting forces should not connect steamer suctions to private hydrants of systems which are already supplying streams under adequate pressure when any other source of water supply is available."

The Criminal Wood Shingle Roof Again

A BLOCK of frame warehouses along Hillsborough River in Tampa, Fla., was destroyed by fire early November 26 and thirty dwellings in the fashionable resident district across the river caught fire from flying sparks, the entire loss and damage being estimated at from $80,000 to $100,000. The menace of shingle roofs was demonstrated by the fact that sparks from the warehouses swept across the river and set fire to the dwellings, three of which are a total loss.

A considerable amount of hay and grain, including ten cars of hay stored by the Atlantic Coast Line, was burned. The Tampa Foundry and Machine Company's plant was endangered and the steamship Poughkeepsie was towed from its moorings, but not before the wooden deck posts had caught. This firm, which is the largest individual loser, estimates its loss at $40,000. Material being unloaded from cars for deck work on the Poughkeepsie, which is being built by the Central Hudson Steamship Company, was also burned.

The sparks started fires a mile and a half away. One of the dwellings totally destroyed was a half mile distant from the origin of the flames. The West Tampa fire department assisted the Tampa fire-fighters.

San Francisco Needs Fire Protection Bureau

ALTHOUGH San Francisco, Cal., was swept by one of the most destructive conflagrations recorded in history, its people apparently have not learned the lesson of preparedness against fire. A report lately put out by the New York Municipal Research Bureau emphasizes the weakness of the Pacific Coast city in this important respect, and urges that action tending to remedy the shortcoming be taken at once.

In part the report says:

"By reason of the non-fireproof tunneling from building to building, unprotected wall openings, hundreds of flimsy wooden partitions, barred door openings, defective electric wiring, storage of rubbish, unprotected cook stoves of almost every variety and the like, this section of the city is in constant danger of destruction by fire.

"Not only were these tenements found to be in a deplorable condition, but the entrances to fire escapes were found heavily barred with quarter-inch iron bars made fast with locks and patented bolts, and quarter-inch wire screens; also locks were made fast by secret devices. The evident object of these bars and barriers was to protect apartments which were formerly occupied by Chinese gambling organizations. The Police Department formally notified the Fire Department of these obstructions, and inspection was made by the battalion chief of the district. Orders were issued for the removal of the obstructions, and, according to the records of the department, these orders, which were issued some time in May, were complied with. When the premises were inspected during the course of this survey they were found in the condition described.

"Conflagration areas exist throughout the city, and yet no department of the Government is given the power necessary to force a prompt removal of these conditions. That the fire loss in the city is reasonably low is due to the efficiency of the force in fire extinguishment, but this efficiency in fire fighting can never furnish adequate protection against possible conflagrations if conditions which exist to-day are permitted to continue for any length of time."

Fire Menace of Railways

HOW property adjacent to railways, as well as that owned by such corporations, is subjected to fire menace was pointed out by Alexander Brociner in a recent address before the New York Chapter of the National Fire Protection Association.

In part Mr. Brociner said:

"Even railway stations, roundhouses and shops are permitted to be built of wood, and in some places we find small stations having shingle roofs.

"The percentage of loss in this class of property is high and the destruction entails a loss above the actual value of the property in crippling operation and resultant loss of revenue.

"The relative importance of the value of railroad property destroyed shows that sparks from locomotives occupy about second place of all sundry hazards involved in the destruction of railroad property.

"The fire loss records of the railroads of this country show us that too little attention is being paid to safeguarding against fire the so-called country station, with values ranging from $1,000 to $5,000.

"The development of the use of electric power for the operation of trains and street cars has brought about also a permanent fire menace to all structures carrying them and to the combustible buildings in their vicinity. A short circuit can ignite inflammable materials as easily as the sparks or hot cinders of locomotives.

"The elevated railways of New York present at almost every turn great fire hazards not only along their lines but also at their various stations, terminals and yards. Wooden cars, creosoted wood ties and platforms all are liable to furnish excellent fuel for a roaring fire which may be easily caused by a defective shoe or by a short circuit of some other origin.

"The principal causes why the fire menace of railroads is so great in the United States are in the first place the lack of proper and uniform laws and regulations for the safeguarding of property and human life, and in the second place the lack of authority of the various Federal, State and city departments having jurisdiction on the matter to strictly and effectively enforce such laws wherever they exist."

$1,000,000 for Fire-Fighting Apparatus

COMMISSIONER ADAMSON has asked the city of New York for forty-five tractors for steamers at $3,608.75, $162,393.75; four tractors for hook and ladder trucks at $3,608.75, $14,435; one tractor for water tower, $4,500; fifty-six new type combination engines and hose wagons, gasoline propelled, at $7,945, $444,920; twenty-eight aerial trucks at $8,500, $238,000; forty-five tenders, regulation, at $3,749, $166,705; seven city service trucks at $4,737, $33,159. Total, $1,066,112.75.

"The fifty-six combination engines would be of the new single type unit engines, of which we now have seven in the department," Commissioner Adamson said. "They are the most powerful and most efficient of modern fire apparatus. They are not only driven by gasoline power, but the pumping at fires is done by gasoline power instead of coal power. They are wonderfully economical in operation as compared with the old coal burning fire engines."

Edited by
ERNEST McCULLOUGH, C.E., M. Am. Soc. C.E.
Chief Engineer Fireproof Construction Bureau
H. COLIN CAMPBELL, C.E., E.M.
Director Editorial Bureau
Portland Cement Association

A Department Devoted to the Use of
PORTLAND CEMENT
in Consistent Firesafe Construction

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Reinforced Concrete Construction Forms

UNDER the above title the Twenty-third Annual Report of the Chief Factory Inspector for Illinois devotes 11 pages to a discussion of this very important subject. The recommendations made in that report should be followed by every State. Architects and contractors can profit by carefully studying the tables, and it is here reproduced without change, other than the correction of typographical errors:

Reinforced Concrete Construction Forms

"Due to the many serious accidents that have happened in connection with reinforced concrete building construction, this department, by reason of the authority vested in it under Section 1 of the 'Structural Safety Law,' suggests certain methods, which are explained below, to contractors and builders for the safety of workmen and pedestrians.

"The section of the law referred to follows:

"'Section 1. Be it enacted by the people of the State of Illinois, represented in the General Assembly: That all scaffolds, hoists, cranes, stays, ladders, *supports,* or other mechanical contrivances, erected or constructed by any person, firm or corporation, in this State, for the use in the erection, repairing, alteration, removal or painting of any house, building, bridge, viaduct, or *other structure, shall be erected and constructed in a safe, suitable and proper manner, and shall be so erected and constructed, placed and operated, as to give proper and adequate protection to the life and limb of any person or persons employed*

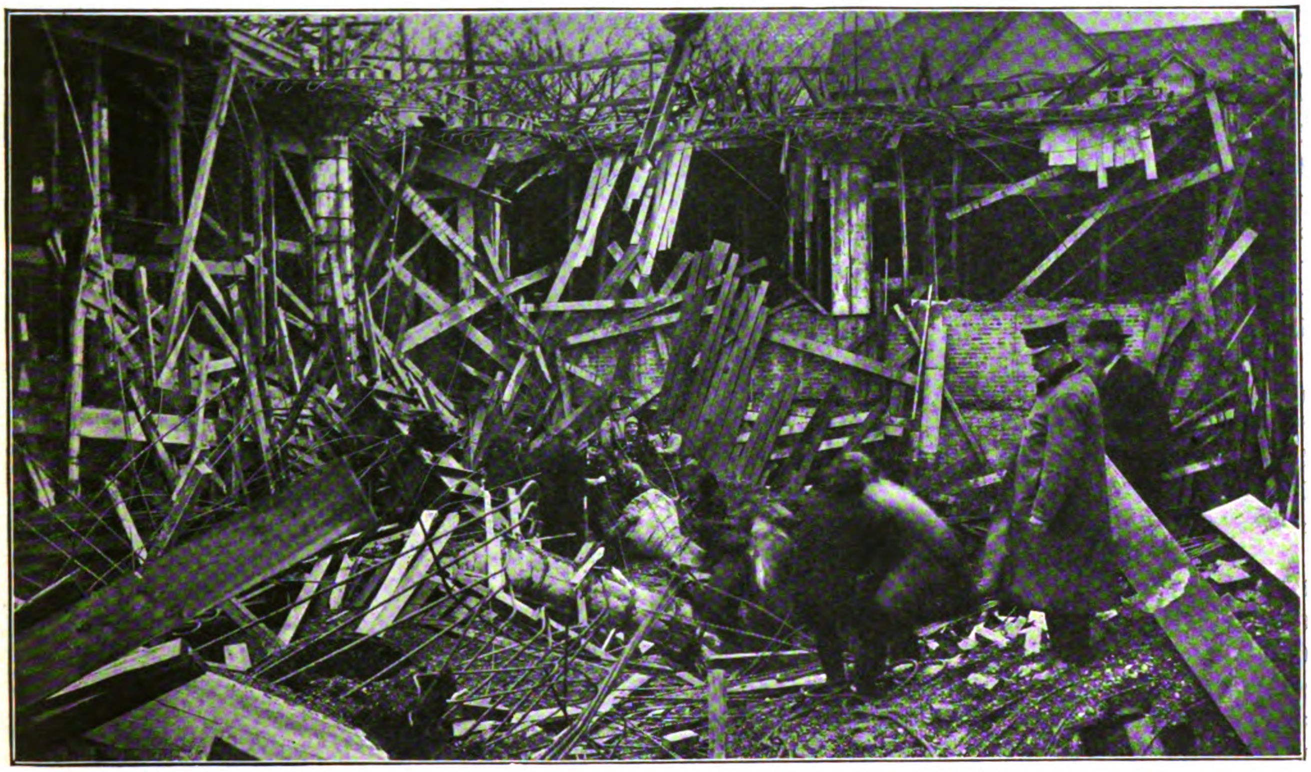


Fig. 1.—Collapse of concrete structure due to weak forms and inadequate supports, when the forms gave way and the structure fell two men were killed and one injured

or engaged thereon, or passing under or by the same, and in such manner as to prevent the falling of any material that may be used or deposited thereon.

"Numerous accidents, where one, two and three men have been killed and others seriously injured, were investigated by this department during the last year. In addition to these accidents many complaints from men engaged in this class of building construction, who considered their lives endangered by faulty building methods, were investigated. In almost every case the department issued orders to contractors for additional reinforcements under concrete forms by the use of stronger posts and braces.

The Cause of Accidents

"On investigation the cause of these accidents or dangerous conditions was found to lie in the placing of improper and insufficient supports underneath the concrete forms, causing the forms to break down even while pouring. In some cases, while the forms did not actually fall down, they began to sink slowly, to buckle, and to break the bond between the concrete and steel.

"It has also been found on investigation that, where the supports were just about strong enough to carry the first floor concrete load, the concrete set very slowly on account of weather conditions. The contractor added the next story and the extra weight caused the first floor to collapse.

"A concrete floor is designed to carry a certain load per square foot when the concrete has attained full strength. Until this strength is reached the supports must carry the entire load. The lower floors must sustain the weight of several floors above, the load being carried through the supports under the upper floors. The load on the supporting floors is reduced as the concrete sets, and is thus enabled to assist in carrying its own weight and a part of the load from above brought down to it. If the setting is retarded or the concrete freezes without setting, the hardening of the concrete does not relieve the load on the supports. In such an event the lower supports gradually give, and when the contractor begins removing them an accident must result. Our investigations also show that it is a common matter for contractors in placing forms to consider only the strength of the supports. *The strength of the floor,* which much sustain the *supports,* is not taken into account.

"Forms should be designed not only for strength, but also for stiffness. Next to the proper design of the structural part, the proper design of the form is the most important part of reinforced concrete construction. The cost of the forms amounts to on the average 33 1/3 per cent of the cost of the entire work under good management, and often reaches more under poor management. It is surprising to see in how few instances the form work is designed by a competent person, and *practically any foreman who declares himself competent* is given charge of the designing of fully 33 per cent of the work. Almost any contractor who has the courage to bid on a reinforced concrete construction job is awarded the contract for its execution as long as he is the low bidder. This work should be intrusted to a designing engineer or architect.

Contractor Not Fully to Blame

"The blame for this condition is not altogether the fault of the contractor. While we find numerous books of instruction on the treatment of concrete, rods, etc., no handbook contains the methods of construction of concrete forms, giving tables of how to place joists, stringers or girders and posts of different sizes of lumber. Therefore, the ordinary foreman or contractor who has had no technical education has had no guide or instructions to follow in the past.

"When floors are combination tile and concrete, posts must not rest directly on the floor. They must rest on planks not less than 3 by 12 inches laid on the floor across the ribs between the tile. Posts made of 2 by 4s or 2 by 6s or 2 by 8s spiked side by side should not be used. If solid 4 by 4-inch or solid 4 by 6-inch posts connot be obtained, and built-up posts are to be used, they should be made in "T" shape. Nails or spikes used in making "T" shape posts must be three times as long as the piece through which they are driven, so two-thirds of the length will be in the stem of the "T," and must be spaced not more than four times the thickness of the flange of the "T." The strength of a "T" shape post properly made is about two-thirds that of a solid piece of the same over-all dimensions. Care must be taken to distribute the load equally on both pieces of a "T" shape post.

Another Dangerous Practice

"Another dangerous practice is that of building up short posts by placing a number of blocks under them. Workmen passing by are liable to kick them from under the posts; or again, they may not be properly placed under the posts, the result of which is that the posts slip off the built-up blocks and the weight of the concrete is thrown on the floor.

"On a reinforced concrete job the foreman ought to detail a man a certain time each day to pick up all loose pieces of boards having nails in them, to avoid the many serious accidents that arise as the result of men stepping on nails. In every case where a man steps on a nail, or gets a slight scratch from a nail, he should receive the attention of a physician to avoid infection. The department's attention has been called to many serious cases where men have lost their limbs and lives as a result of infection from neglected wounds caused by stepping on nails.

The article and tables given below were written and compiled by Mr. Ernest McCullough, C.E., a well-known consulting engineer, based on ordinary lumber such as contractors generally use for forms and centers. After this article was written Mr. McCullough entered the employ of the Portland Cement Association.

"The Safeguarding of Life in the Erection of Reinforced Concrete Buildings

"By Ernest McCullough, Chief Engineer, Fireproof Construction Bureau, Portland Cement Association

" Wise economy in using forms is commendable. Foolish economy is criminal. Few architects exercise proper supervision over this very important item in the erection of reinforced concrete buildings. The loss of life in consequence is appalling, and no lives should be lost. A person would think that bent centering indicates weakness, but too many men do not regard it as dangerous, saying, "When the concrete sets the pressure will be relieved." They do not know, or perhaps fail to realize, that while the centers are bending the concrete is moving, and during this time it is also setting and hardening. Reinforced concrete owes its strength to the bond between the concrete and steel, and a perfect bond cannot be obtained if there is any disturbance or movement of the materials during the three hours following the filling of the forms.

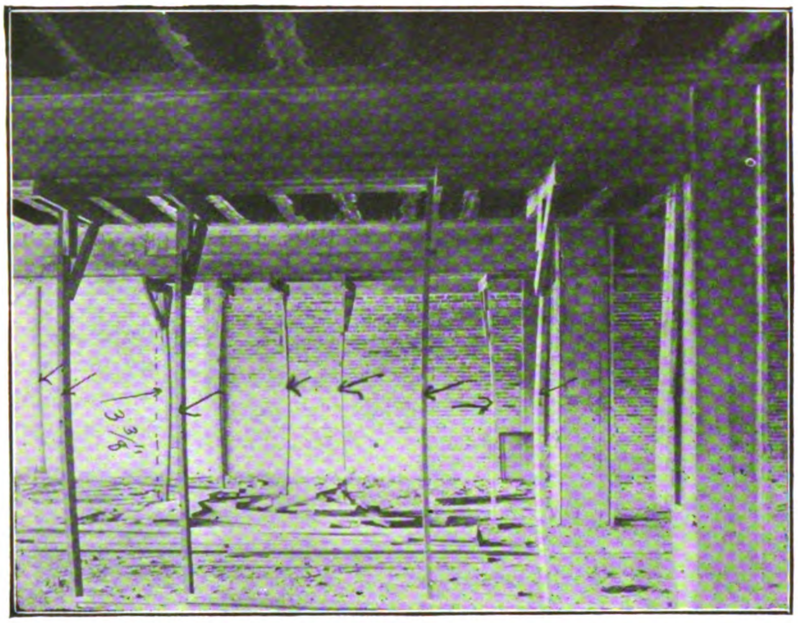


Fig. 2.—Second floor, note conditions of posts left under girder. Supports taken out from under slab. Girder 36 ft. long, 21 in. deep and 14 in. wide below ceiling; 2-in. by 6-in. posts below girder spaced 2 ft. 6 in. apart. Posts 11 ft. 0 in. long. All are buckled from 2½ in. to 3⅜ in.

Summary Punishment Advised

" 'It is not uncommon to see centers ten feet long bent in a bow having an ordinate of seven or eight inches. Architects permitting this should have their license taken away. Inspectors on such work should be discharged, and contractors using such methods should not be bonded by surety and casualty companies.

When 2 + 2 Does Not = 4

" 'It is not uncommon to see 2-inch by 4-inch pieces spiked together to make one 4-inch by 4-inch post. Men who understand the most elementary facts about column design know that such construction is bad. To see it on any job advertises the incompetency of the architect and his inspector, who are supposed to know such things. The ratio of slenderness fixes the strength of a column. For example, in the Chicago Building Code a short block of white pine can be used with a safe fiber stress of 800 pounds per square inch. If the length divided by the *least* thickness equals 15, the safe fiber stress is 596 pounds per square inch. If the length divided by the *least* thickness equals 30, the safe fiber stress is 437 pounds per square inch. Assume a post 4 inches by 4 inches square and 5 feet long, the ratio is 30 and the safe fiber stress is 437 pounds per squaqre inch, and the total safe load will be 16 times 437 equals 6,992 pounds.

" 'If two 2-inch by 4-inch pieces are spiked together we really have two posts each 2 inches thick, so the ratio becomes 60. Long experience has shown this to be dangerous and 30 is the limit set for wood. Experiments have proven that two pieces fastened together in this manner do not act together. If the load is not so distributed that each piece carries exactly one-half, then one piece may be nearly gone before the other piece begins to help. It is impossible to use enough nails to make them act together as one piece.

" 'Two 2-inch by 4-inch pieces should be spiked together in "T" shape with large nails not more than 6 inches apart The least width is 4 inches, and this should be used in figuring the slenderness ratio. One 2-inch by 4-inch forming a "T" with one 2-inch by 6-inch makes a post having a least thickness of 6 inches. Similarly, one 2-inch by 6-inch forming a "T" with one 2-inch by 8-inch makes a post have a least thickness of 8 inches. If the pieces are not fastened together with 20d, or longer, nails or spikes 6 inches on centers they will not act properly as one piece. When properly made such posts have about 90 per cent of the strength of solid pieces of the same width and area. Built-up posts should never be used if solid 3-inch by 4-inch, 4-inch by 4-inch, or 6-inch by 6-inch can be purchased.

Holes Punched in Floors

"'It is not uncommon to see the ends of posts resting directly on concrete floors, thus concentrating great weight on a small area. Occasionally a piece of wood one foot square is placed under the post. This is especially bad when the floors consist of small concrete joists with tile of metal between, with very thin slabs of concrete covering these tiles or metal forms. Holes have been punched through such floors many times by centers and posts under floors above.

"Centers should be tied together in four directions so their greatest length will be no more than 30 times the least thickness. They should be vertical. The girders they carry should be positively over the center. Do not spike posts to sides of girders, or let girders rest on edge of posts. They should be full length and no blocks should be used at the lower end, for such blocks can be, and often are, knocked out. If wedges are used they should be double and as thin as possible. Under all posts planks should go clear across the floors to distribute the load. Spacing of centers at intervals of more than 6 feet should not be allowed, for greater spacing will cause too heavy concentration on the floors.

"'Slab forms usually consist of a platform of boards carried on joists, and these joists are carried on girders, which in turn are carried by the posts, which are called centers. Deep, thin girders should be braced up about 4 feet apart to stiffen them like cross bridging stiffens floor joists. Tables are presented here fixing minimum spacing for joists, girders and centers. In order to utilize the material carried by local lumber dealers a choice is given of sizes in all tables. For convenience of reference Table I contains a description of the slabs with a number given to each slab. Reference is made to slab numbers in the tables following instead of to a slab thickness.

"'Several planks of the same wood used as beams may be spiked side by side and they will act as a solid piece, in this respect differing from pieces placed vertically and loaded on end. Girders may be built up.

Length of Time for Centers to Remain in Place

"'In pouring floors of buildings lumber should be provided for not less than three floors when the temperature is above 50 degrees Fahr. When the temperature is lower than 50 degrees Fahr. the amount of centering and forms must be increased.

"'When forms are removed from slabs, beams, girders and columns one-half of the centers must be put back and remain in place for not less than a week to permit the concrete to dry out and harden.

Length of Time for Forms to Remain in Place

"'When the temperature outside is above 60 degrees Fahr. wall and column forms may be removed within 72 hours and the side forms may be removed from beams and girders the following day. Forms under bottom of slabs, spans of 6 feet or less, should remain in place four days, plus one day extra for each additional foot of span. Bottom of beams and girders less than 14 feet span, 14 days, plus one day for each additional foot of span.

"'When the average outside temperature during the period of setting is between 50 degrees Fahr. and 60 degrees Fahr., add four days' time for under side of slabs, beams and girders and two days for columns and sides of beams and girders. When the outside average temperature during period of setting is between 40 degrees Fahr. and 50 degrees Fahr. and the interior temperature has not fallen below 40 degrees Fahr., do not remove forms from columns and the sides of beams and girders under ten (10) days. Forms to remain under slabs and on bottom of beams and girders for not less than two weeks.

When the average temperature falls below 40 degrees Fahr. the forms shall not be removed until careful tests show the concrete is set and is not frozen. The time given for forms to remain in place must be understood as the minimum length of time, and in all cases before removing them care must be taken that the concrete has set hard enough to fully warrant their removal.

To Test Concrete for Freezing

"'Only one test is of value to determine whether concrete is frozen, and this is by using hot water.

"'The water should have a temperature of not less than 150 degrees Fahr. and should not be boiling. A piece of frozen concrete immersed in hot water of this temperature will soften in from three to four minutes. To test a floor construct a tight dam to enclose an area several feet square and keep four inches of hot water on it. If the floor does not soften in half an hour the concrete may be considered safe. The water will rapidly cool down when thus applied, but if at the end of half an hour it is still warm the desired result will be obtained. Water having a temperature of 70 degrees Fahr. is just as effective for making the test but is slower in results, sometimes requiring several hours to thaw the water and bring out the frost. Deluging suspected concrete by hose for half an hour with hot water, or for several hours with tepid water, has proven effective.

" 'Boiling water may remove the frost and immediately start the setting action and so give false results.

Concreting in Cold Weather

" 'When the outside temperature falls below 50 degrees Fahr. during working hours, or within an hour after quitting time, the building should be enclosed.

" 'When the temperature falls as low as 40 degrees Fahr., salamanders, or some other heating method, should be installed in the building, and under no circumstances should the temperature within the building be permitted to fall below 40 degrees Fahr. while the forms and centers are standing.

" 'When the temperature falls below 40 degrees Fahr., the contractor shall heat the water, sand and coarse aggregate and guard carefully against allowing frost or pieces of ice or lumps of frozen material getting into the concrete.

" 'The amount of water used during cold weather must be reduced and concrete deposited in forms must feel warm to the hand.

Consistency of Concrete

" 'The use of concrete with so much water that it resembles the consistency known as 'soupy' or 'sloppy' should not be tolerated. The ideal consistency should be no softer than medium soft tooth paste and the maximum amount of water should not exceed six (6) pounds per cubic foot of cement, sand and coarse aggregate.

Tables for Form Work

" 'The following tables should be followed in constructing forms and erecting centering, remembering the warning about built-up posts. Solid posts should be used when possible. No departure should be made from same without filing in the office of the Illinois Department of Factory Inspection complete detailed

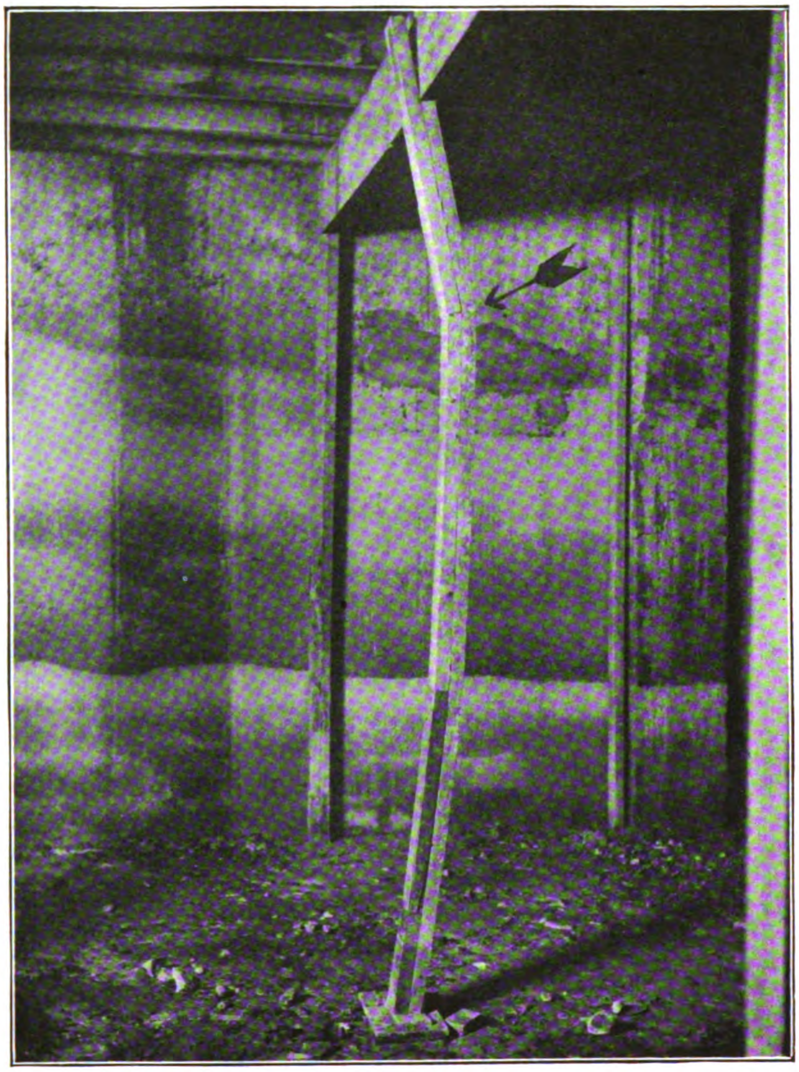


Fig. 3.—Showing weakened support by splicing, arrow points to knot in timber. Note poor condition of support at top underneath joist

drawings, in duplicate, of the form work and centering by an Illinois licensed structural engineer, same to bear his signature and official seal; said forms and centering not to be used until same have been checked and approval given by the State Inspector or proper deputy.

TABLE 1—SLAB NUMBERS

Slab numbers.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Slab thickness in inches—																	
Solid slab......	3	4	..	..	5	..	..	6	..	7	..	8	..	9	10	11	12
Combination tile and concrete...		6	7	8	..	9	10	11	12	13	14	..	15	..	..	..	..

TABLE 2—TABLE OF POSTS FOR CENTERING

3 inches by 4 inches solid, to be spaced 4 feet by 6 feet or less, under slabs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, braced in four directions every 7 feet. To be spaced 4 feet or less under slabs 11, 12, 13, 14, 15, 16, 17, and 4 feet part under girders or beams.

4 inches by 4 inches solid, or T post or 2-2 inches by 4 inches, properly spiked. To be spaced 6 feet by 6 feet or less, under slabs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 braced in four directions every 8 feet. To be spaced 4 feet by 6 feet or less under slabs 11, 12, 13, 14, 15 16, 17, or 5 feet apart under girders or beams.

6 inches by 6 inches solid, or T post of 2 inches by 4 inches and 2 inches by 6 inches, properly spiked, braced in four directions every 8 feet. To be spaced 6 feet by 6 feet or less, under slabs 12, 13, 14, 15, 16, 17, or 6 feet apart under girders or beams.

" 'It is important that the above requirements for length of posts be observed. They may be of any length to conform to clear height, but must be tied in four directions so the greatest length from end to tie shall not be more than above stated. The ties may be horizontal or diagonal and should be well secured by nailing.

" 'It is important that the posts rest at the lower end on a plank in order to distribute the load over the floor. Use a 2-inch by 12-inch for spacing of 4 feet by 4 feet; a 3-inch by 12-inch for spacing of 4 feet by 6 feet, and 4-inch by 12-inch for spacing of 6 feet by 6 feet. These planks are parallel with and directly under the girders carrying the joists.

Securing Wedges

" 'Posts must be full length and must not be used with blocks under the lower end. Wedges when used should be in pairs and thin. Do not drive nails through wedges, for this interferes with adjustment. To prevent the working loose of wedges drive a nail into the plank or fasten a block to the plank, bearing against the heavy end of each wedge.

" 'Care should be taken to have posts as nearly as possible directly over posts below in a vertical line from story to story.

" 'All posts should be plumb. This is important.

TABLE 3
Size and spacing of joists on 4-foot span

Slab Number	*Size, Inches*	*Spacing Inches*
1	2 by 4 2 by 6	16 24
2 to 15 inclusive........	2 by 6	24
16	2 by 6	21
17	2 by 6	21

TABLE 4
Size and spacing of joists on 6-foot spans

Slab Number	*Size, Inches*	*Spacing Inches*
1, 2......................	2 by 6 2 by 8	16 24
3	2 by 6 2 by 8	15 24
4, 5, 6..................	2 by 6 2 by 8	14 24
7, 8.....................	2 by 6 2 by 8	12 24
9, 10, 11, 12, 13..........	2 by 6 2 by 8	12 21
14, 15, 16, 17............	2 by 8 2 by 8	21 18

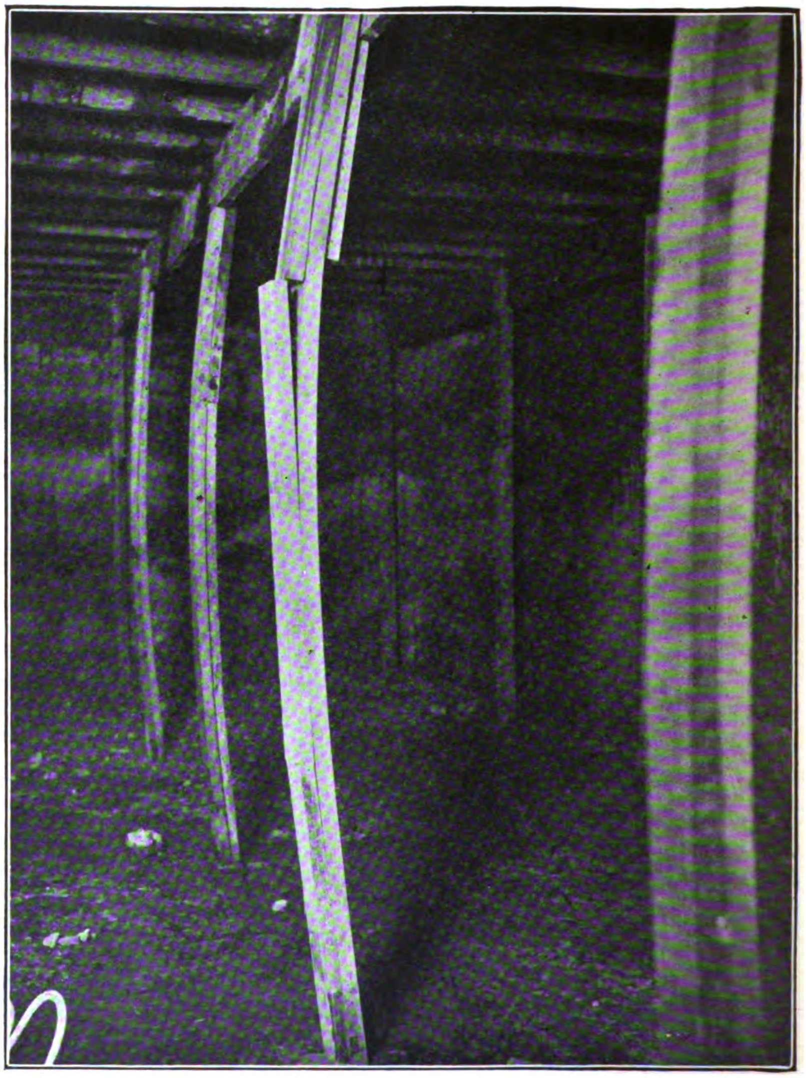


Fig. 4.—Pressure of upper floor causes these insufficient and poorly spliced supports to bulge

"'Flooring over joists may be ⅞ inch thick (1 inch dressed) on spans of less than 21 inches. It must be a full 1 inch (1¼ inch dressed) on spans of 21 inches and 24 inches.

"'Girders may be composed of several boards or planks side by side, care being taken to accurately size the pieces over bearings so they will act together. They should be spiked together, and if 1-inch lumber is used with heavier stuff the thinner pieces should be inside.

TABLE 5

Minimum sizes of girders across posts on 4-foot span. Span of joists 4-foot or 6-foot

Slab Number	*Sizes, Inches*
1, 2	2 by 10, 3 by 8, or 4 by 6
3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	2 by 10, or 3 by 8
14	2 by 10, 4 by 8, or 6 by 6
15	3 by 10, 4 by 8, or 6 by 6
16	3 by 10, or 4 by 8
17	2 by 12, 3 by 10, or 4 by 8

TABLE 6

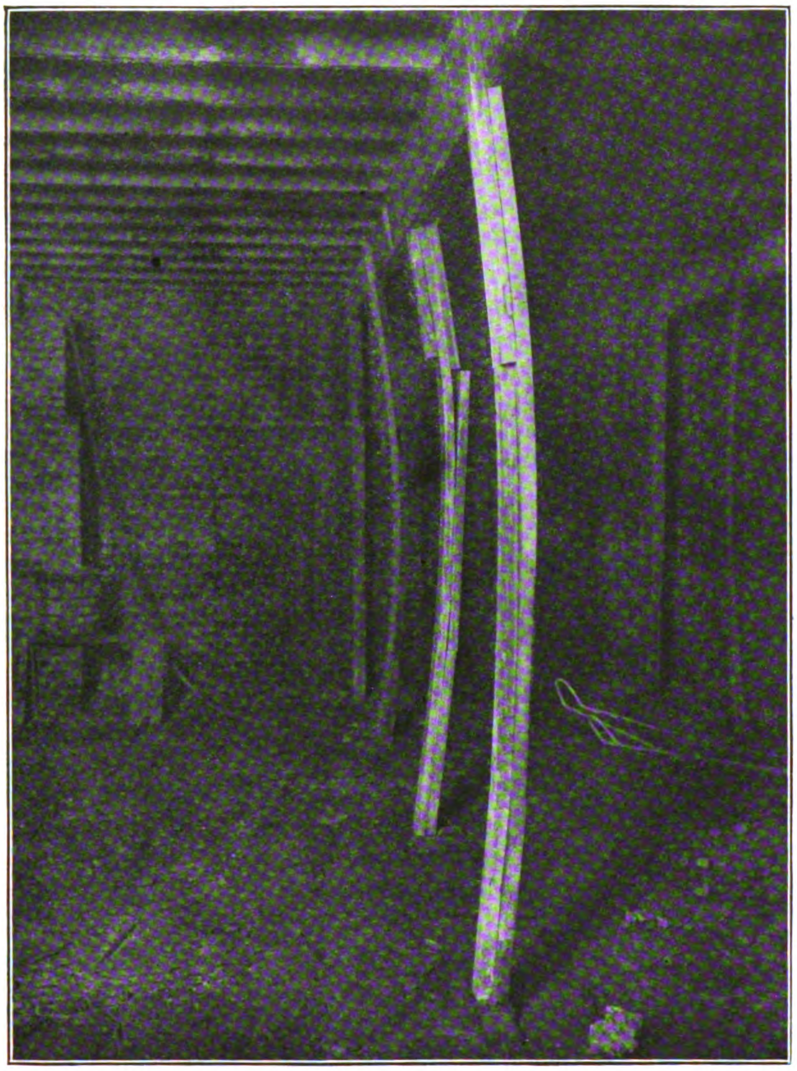
Minimum sizes of girders across posts on 6-foot span. Span of joists 4-foot or 6-foot

Slab Number	*Sizes in Inches*
1	2 by 12, or 3 by 10
2, 3	3 by 12, 4 by 10, or 6 by 8
4, 5, 6, 7, 8, 9	2 by 14, 3 by 12, 4 by 10, or 6 by 8
10	2 by 14, 3 by 12, 5 by 10, or 6 by 9
11	3 by 12, 6 by 9, or 7 by 8
12, 13	3 by 12, 5 by 10, 6 by 9, or 7 by 8
14	4 by 12, 5 by 10, or 6 by 9
15	3 by 14, 4 by 12, 5 by 10, 6 by 9, or 8 by 8
16	2 by 16, 3 by 14, 4 by 12, 5 by 10, 7 by 9, or 8 by 8
17	2 by 16, 3 by 14, 4 by 12, 6 by 10, or 7 by 9

All girders to be braced or cross-bridged every 4 feet.'

"Following the suggestions contained in Mr. McCullough's article, it is absolutely necessary that a licensed structural engineer be attached to this department."

Fig. 5.—Another view of inadequate supports showing the extent to which even the top joist is forced out of alignment



Standardizing School House Construction

APPRECIATING the need for improvement in schoolhouse construction with a view to increased safety against fire, better sanitation and the more economical utilization of space, the Committee on Standardization of Schoolhouse Design and Construction of the National Education Association has issued the subjoined statement, outlining its task and the results attained in its prosecution thus far:

"In the United States over one hundred millions of dollars are spent each year for new school buildings, the plans of which have been chiefly selected on the basis of the personal preference of architects, educators and members of school boards, rather than from fitness and economy of arrangement ascertained by the application of tests.

"Up to the present time no data have been collected for establishing national standards by which to judge the skill that has been exercised in working up the plan or to check the plan as to economy of erection.

"This has caused great variation in the plans of school buildings of the same type and number of rooms and probably leads to a great waste of public money.

"A study of published plans shows many of these variations to be of primary importance in schoolhouse design; and results obtained by investigations into the cost of school buildings (such as the investigations by the Cleveland Board of Survey) show an apparent waste of public money.

"Any comparison of a number of school buildings of the same type, the same number of rooms, and the same general construction, exposed unwarranted difference in their cost.

"The situation therefore demands an investigation to determine whether the money appropriated is being spent to the best advantage and how to eliminate waste.

"The investigation should also furnish data by means of which officials and committees could judge the economy and suitability of plans for school buildings when submitted to them.

"The Department of School Administration of the National Education Association considered this situation at the New York Convention (July, 1916) and appointed a commmittee to investigate the subject of school architecture. The committee included Frank Irving Cooper, architect, Boston, chairman; Mr. S. A. Challman, Commissioner of School Buildings of Minnesota; Mr. C. E. Chadsey, Superintendent of Schools, Detroit; Dr. Louis M. Terman, professor of hygiene, Stanford University, and Dr. Leonard P. Ayres, director, Department of Education, Russell Sage Foundation.

"The immediate business of the committee will be an endeavor to determine a definite basis for its work and may be separated into three divisions.

"First.—To select from those standards the details in construction pertaining to school architecture which have already been determined upon by the various States and which are in general use by various trade organizations.

"Second.—To select from standard details those usually accepted by educational authorities.

"Third.—To fix standards of school planning.

"The first and second parts of this work call for correspondence with authorities on existing standards, and it is hoped that school boards and school officials will furnish the committee with such information as may be called for from time to time, and also furnish opportunities for investigation by the committee or its representatives.

"The third part means original research analyzing the architectural plans of floor arrangements of school buildings, to determine relative areas set apart for different uses and to form such scientific standards as may be applied by persons unskilled in the intricacies of the architectural profession in order to enable them to test plans submitted to them.

"Plans and cost sheets of buildings already erected will afford a basis for study which will be very much appreciated.

"General findings only will become public property for the use of all who have to do with the school buildings of the United States."

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Shutterless Courts at Boston

BOSTON, from a fire-safe standpoint, is far from being in satisfactory condition, and the insurance interests are constantly trying to make the fact apparent to the municipal officials and to property owners generally.

Speaking upon this subject recently, a fire insurance inspector said in part: "Little has been done to remedy the shutterless courts and alleys, which are narrower and more circuitous in Boston than in any other city in the United States. The effectiveness of penalization of vertical openings in the rate schedule is offset by light exposure charges and recognition of shutters that don't shut. But few fireproof buildings are being erected in Boston, nor are the old structures being remodeled to any considerable extent."

Edited by
SAMUEL GEORGE WEBB
Secretary
Gypsum Industries Association

A Department Devoted to the Use of

GYPSUM

In Consistent Firesafe Construction

Special inquries regarding the use of Gypsum will be fully answered and any desired information may be obtained by addressing the Office of Construction

The Fire and Heat Resistent Properties of Gypsum

IN this section last month we touched very briefly upon the "fireproofness" of gypsum. In this issue we propose to consider this question in greater detail.

Resistance to Heat.

Very exhaustive work has been done on this by the Underwriters' Laboratories in Chicago, and more recently by the United States Bureau of Standards at their Pittsburgh, Pa., testing station.

This work has emphasized and proved beyond peradventure the high degree of resistance opposed by gypsum to the passage of heat into and through itself; the reason for this being the one given in our brief discussion of the subject in the November issue, that the heat has to liberate the water of crystallization in the gypsum and is then greatly retarded by the presence of the liberated water.

In the elaborate tests conducted by the Underwriters' Laboratories, above referred to, they used blocks of gypsum made in all respects similar to the "gypsum blocks" of commerce, but in the special size of 24 inches by 24 inches by 6 inches. The United States Bureau of Standards at Pittsburgh employed gypsum poured into cylindrical forms, the cylinders being 16 inches long and 8 inches in diameter. These cylinders were subjected to a temperature of 1,700 degrees Fahr. for a period of four hours, and in addition to the pyrometers for the measurement of the heat to which the outside of the cylinders were exposed, four thermo-couples were imbedded inside the materials at intervals of one inch apart, commencing one-half inch from the outer surface to within one-half inch of the center, from which readings were taken simultaneously with the pyrometer readings of the furnace heat. The composition of these cylinders of gypsum varied to cover the range of manufacturing practice.

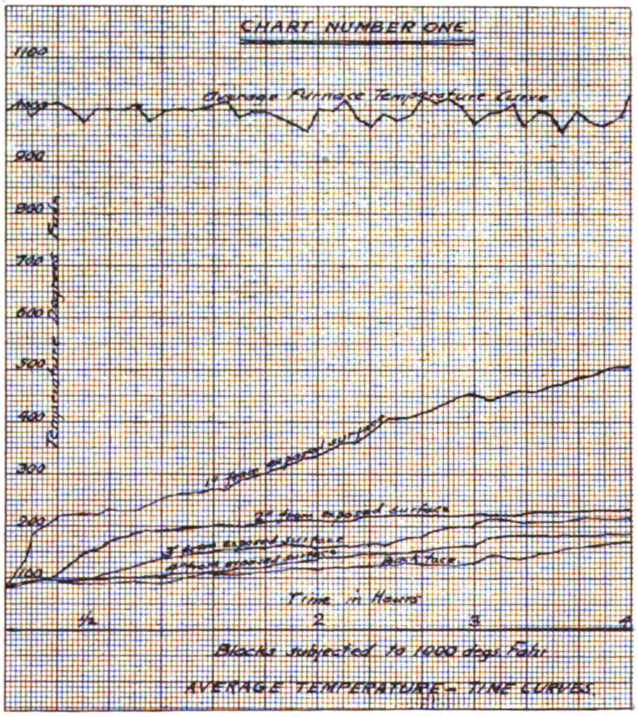
This work is completed, but the results have not yet been published in the form of a Government bulletin, but will probably, in the near future, appear as a technical paper in one of the engineering periodicals.

Confirming Previous Results

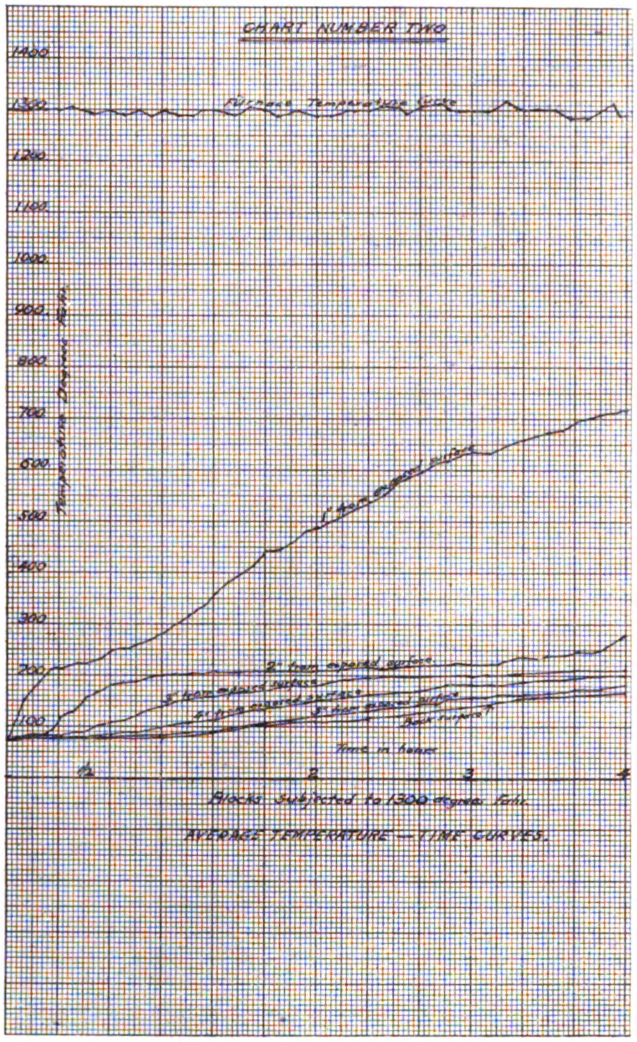
The results, however, fully confirm the previous results secured at the Undewriters' Laboratories in demonstrating the extremely slow passage of heat into the material and the increasing slowness of the passage of the heat into, and the calcination of, the material as the tests progressed and the time elapsed.

We will here consider some of the details and the essential results of the earlier tests conducted at the Underwriters' Laboratories.

Unlike the tests conducted by the Bureau of Standards, where one time exposure and one temperature, namely, four hours at 1,700 degrees Fahr. for each of



the cylinders tested, was used, the Underwriters' Laboratories used five separate temperatures, namely, 1,000 degrees Fahr., 1,300 degrees Fahr., 1,600 degrees Fahr., 1,900 degrees Fahr., and 2,200 degrees Fahr., and tested separate blocks at each of these temperatures for different times of exposure, namely, one-half hour, one hour, one and one-half hours, two hours, three hours and four hours. There were, therefore, thirty separate tests conducted.



At the back of each block away from the fire exposure was cemented a block of compressed asbestos two inches in thickness and covering the entire back of the block. These asbestos blocks were cemented to the gypsum blocks with plaster of Paris. Six thermo-couples were imbedded in each block, placed at equal distances around the circumference of a circle five inches in diameter, with its center in the exact center of the block. These thermo-couples were imbedded at one-inch intervals, commencing at one inch from the face of the block, and the last couple being at the back face of the block.

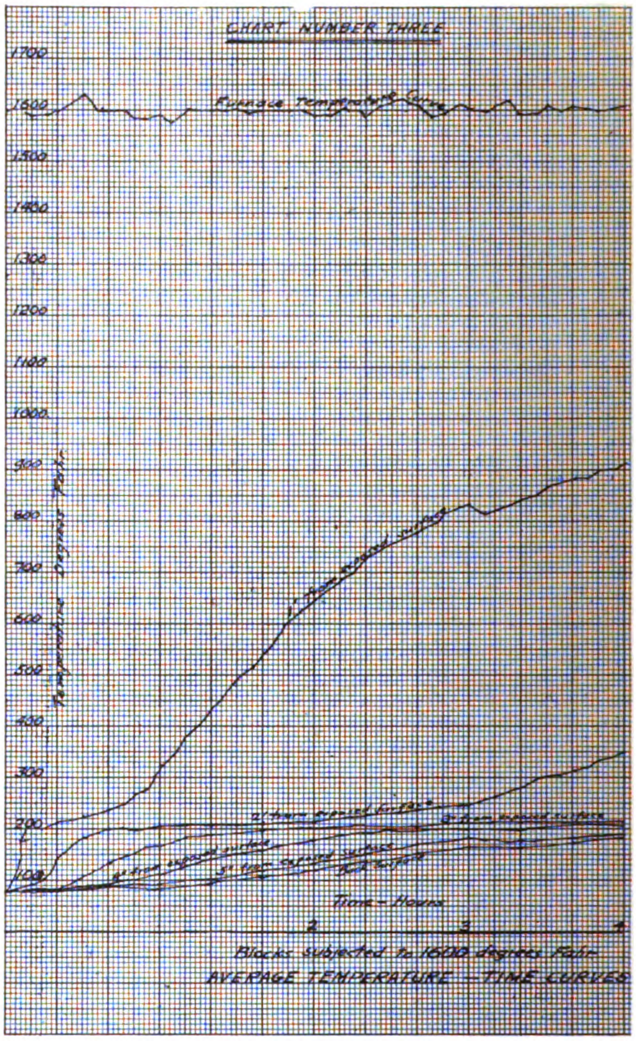
The readings of the pyrometers giving the furnace temperatures and of the thermo-couples were taken at five-minute intervals.

We are able to illustrate these results by time and temperature curves of each of the temperatures. These five charts show in each case the furnace readings and the readings of the thermo-couples at one inch, two inches, three inches, four inches, five inches and six inches from the heated face.

These charts illustrate very clearly indeed just what happens in the interior of the blocks.

Phenomena Shown by Chart

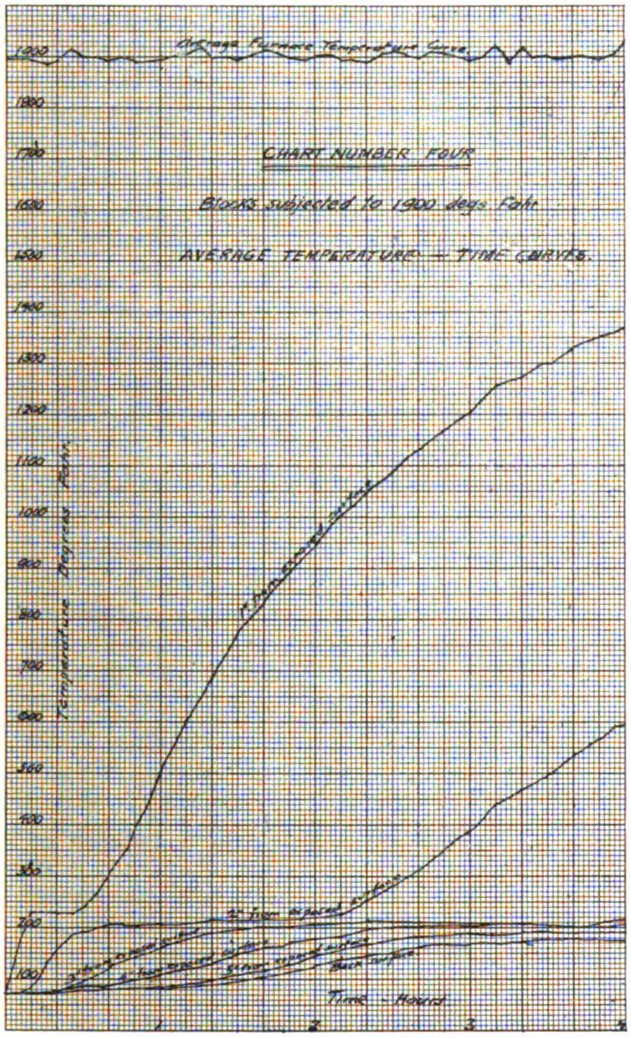
Referring to the first chart, which records the results of the 1,000-degree Fahr. fire exposure, it will be noticed that the temperature curve one inch from the exposed surfaces are sharply raised to about 220 degrees Fahr. in the first twenty minutes, and remains practically stationary for one hour and a half, when it begins to rise very slowly to meet the furnace temperature, but does not meet this in the four-hour limit of the test. In the same chart it will be seen that the temperature curve at two inches from the heated surface rises very gradually and very slowly to about 200 degrees Fahr. in two hours and remains practically



constant at the end of four hours. The other curves of three inches, four inches, five inches and six inches from the exposed surface show that the material was raised very slowly indeed to the temperature of from 150 degrees to 200 degrees Fahr.

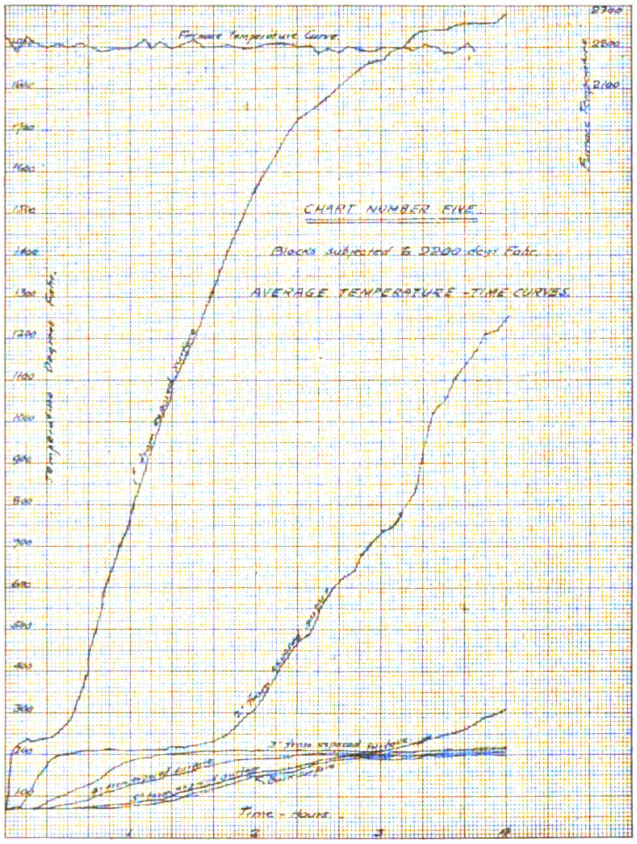
By referring to the second chart, which records the result of 1,300 degrees Fahr. exposure, this shows the same phenomena, only, as would be expected from the higher temperature, somewhat accentuated. In this case the work of liberating the water of hydration was occurring at from one hour to approximately the end of the test at the point two inches in from the heated faces of the blocks, at which time, viz., four hours from the start, the water of crystallization was all liberated and the temperature began to rise.

In the succeeding charts, Nos. 3, 4 and 5, giving respectively the results of exposures to 1,600 degrees Fahr., 1,900 degrees Fahr. and 2,200 degrees Fahr., the same phenomena appear; indeed, all of the results show a wonderful consistency.



The chart of the 1,600 degrees fire exposure shows that the material one inch in from the heated face reached the temperature required for calcination in fifteen minutes, and the water of crystallization was all liberated and the temperature curve began to rise after a lapse of fifty minutes. At two inches the dehydration occurred between three-quarters of an hour and two hours, at which time the temperature began to rise.

In the fourth chart, giving the results of the 1,900 degrees Fahr. exposure, it was only after a lapse of four hours that the temperature of the material began to rise above the 212 degrees Fahr. line at the three inches in from the heated face.



The Most Extreme Exposure

In the most extreme exposure of 2,200 degrees Fahr. shown in chart No. 5 the results are very definite and clear. The period for liberation of the water of hydration shows very clearly in the curve of one inch from the heated face, as also in the curve of the two-inch distance from the heated face, the curves commmencing to rise sharply when the water of hydration had been liberated. In this table the temperature at three inches in from the heated face only reached a little over 300 degrees Fahr. at the end of four hours.

The significance of the results shown in the illustrations is that we know exactly what temperatures we

Full explanation of charts
will be found in this article

meet at definite distances inside the material from the exposed face under different durations and intensities of outside fire exposures.

The Protection of Steel

In the protection of steel from the effect of fire this knowledge is highly important—indeed vital—to possess. We know that steel begins to lose its supporting strength at a temperature of about 900 degrees Fahr., after which its loss of strength is extremely rapid, until at 1,600 degrees Fahr. it is practically nil. We are able with the use of gypsum protection of steel to design definite thicknesses of material to protect the steel against acquiring any predetermined temperature, and we know positively that with, say, three inches of gypsum protection the temperature of the steel cannot rise above 300 degrees Fahr. when exposed to 2,200 degrees Fahr. for a period of four hours.

The value of such absolute and definite knowledge in correctly and safely designing the fire protection of the supporting members of steel frame buildings, such as columns, is very great.

Non-Conductivity of Heat

The reasons discussed above for the resistance offered by gypsum to heat are in part responsible for the fact that gypsum is a slow conductor of heat to a marked degree. It will be apparent that the using up of heat units for the work of breaking down the hydrated crystals and liberating the water of crystallization is in itself one reason for gypsum being a slow conductor of heat.

Character of Physical Structure

There is another reason, however, which still further increases the non-conductivity of heat of gypsum.

This is the character of its physical structure. Especially in the case of manufactured articles, such as gypsum blocks, the physical structure is of a chalky character and contains in its mass a multitude of infinitely fine air cells. This is the very condition in a structural material which is the most favorable to the non-conduction of heat, and it will be readily recognized that this physical structure of gypsum is radically different from the great density of materials possessing high conductivity of heat, such as iron and other materials of hard, dense, compact structure.

We owe acknowledgment to the Underwriters' Laboratories in Chicago and to the United States Gypsum Company for the use of these charts, which are copied from charts which form part of the Underwriters' Laboratories' report of these tests.

We will discuss in this section later the effect of water on gypsum structural materials.

Munition Plant Fire Hazard

AN interesting report has been issued by the fire underwriters in New England in regard to the risks which are being carried by the companies in munition plants in Canada and the United States.

The growth of the munitions business has resulted in greater precautions for safety being taken in many factories that were not operated with success prior to the war. They have since become successful, thus minimizing the moral hazard. Overtime also has a tendency to minimize the risk, inasmuch as when work-people are on the premises all the time any incipient fire is more likely to be arrested before actual damage is done.

The following are the features of the report:

Prolonged hours of labor, night work, etc., have increased the period of action of the active special or manufacturing hazards.

A tendency towards uncleanliness has been created or enhanced by long hours of labor, the difficulty of obtaining satisfactory help, the increased congestion of equipment and material, and, above all, by the failure of superintendents, through pressure of other business, to give attention to matters of housekeeping.

The introduction into established risks of new manufacturing or special hazards and processes. In some cases there has been failure to protect these in a satisfactory and permanent manner on the assumption that they were of a temporary character. In other cases there has been failure to realize the true nature of the hazard involved and ignorance of protective methods.

Municipal Bonds and Fire Protection

N the course of an address before the Ontario Municipal Association, Mr. John B. Laidlaw drew attention to the intimate relation between efficient fire protection and the value of municipal bonds. He said: "You are interested in municipal financing and perhaps overlook how materially your ability to sell your debentures at a good price depends on how effective are your fire preventive measures. No bond broker cares to offer to his clients the debentures of a town or city a good part of whose assets are frequently disappearing in smoke. They prefer to sell the debentures of the well-managed place which does not allow its citizens to recklessly endanger their own and their fellow citizens' property, and which maintains a thoroughly efficient water works system and good fire brigade. They know that the assets of such a place are a much better security than those of the other, and the careless town pays a heavy tax each year.

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited by

IRA G. HOAGLAND, Secretary **PAUL MASON, Special Representative**

National Automatic Sprinkler Association

Automatic Sprinklers in Institutional Buildings

FIRE catastrophes in institutions sheltering society's weaker element recently have been features of the news. They prompt a reference to the effort made by the Hon. Herman L. Ekern, when Insurance Commissioner of Wisconsin, to obtain real fire prevention in the State's institutional buildings.

Because it costs less to prevent fires than to pay losses Mr. Ekern, as manager of the State's insurance fund, urged a careful investigation of the State's charitable and penal institutions. The Independence Inspection Bureau of Philadelphia was selected to do the work.

The bureau's report recommended certain immediate action to protect both life and property. By far the most important recommendation was for the installation of automatic sprinklers, with which combustible, hazardous old buildings can be made practically fireproof. This recommendation was specifically made for nine of the State institutions.

The need for such sprinkler equipment was said to be most urgent in the two hospitals for the insane, both because of the helplessness of the large number of inmates confined in each, and of the comparatively large value of the property. Such installation, it was remarked, would not cost more than a very small proportion of the value and would be paid for in a very short time in the immunity from fire, and in addition would obviate the necessity of rebuilding these buildings for a long period of years.

Owners of Sprinklered Properties Approved

An appropriation to provide the sprinkler equipments was asked for in the Legislature. Inquiries were sent to about 400 merchants and manufacturers owning property in Wisconsin equipped with sprinklers. Nearly 200 replied, and all were unanimous in recommending sprinkler equipment. Excerpts from many of the letters are published in the bulletin. The temptation to analyze some of them is irresistible. One lot of replies refer only to individual experiences with automatic sprinklers, another to the need of them in institutional properties. It is the latter group that excites the analytical tendency.

Those who strongly advocate automatic sprinklers in the State's properties are of two sorts, humanitarians and economists. The latter outnumber the former. Some replies indicate a disregard of everything except safety of life, many consider only the economic aspect of sprinkler protection, while a few do that and argue as well the necessity of considering the safety of the lives intrusted to the care of the State.

A Serious Indictment of the State

But the most surprising thing about the replies is the extent of comments from the ranks of the humanitarians on the responsibility of the State in safeguarding human life. Some express surprise that the State lags behind its citizens in this respect, also a lack of understanding of how the State can afford to take grave risks. Others consider the protection of human life in institutions an obligation upon the State, and neglect criminal. One citizen does not want to share the State's responsibilities under present conditions. Another remarks, what would be required of private individuals if they owned the State's properties? These comments constitute a serious indictment of the State.

Those who consider both humanity and economy in advocating automatic sprinklers in State institutions speak also of the good investment feature of the protection, its savings in fire insurance cost, and of its value in conservation of property from fire. The wonderful record of the protection is remarked, and the necessity of it in old buildings emphasized.

Some of the economists express surprise that none of the State's buildings is equipped with sprinklers. Others remark that they would not think of operating their properties without sprinkler protection and question the different practice of the State. A pertinent comment is made on the safety provisions the State requires in private properties and what it has omitted to consider for the safety of its own properties. All of the economists emphasize the insurance cost savings feature of sprinkler protection, and, in addition, some speak of the effective record of sprinklers in controlling fires, and others of the security of business that is assured. One in particular utters a warning against fire insurance agents who would discourage sprinklers.

Several proponents of sprinkler protection for State properties simply extol the merits of the method and comment on its wonderful record. Among these is an advocate of the law to compel the installation of sprinkler protection in State properties.

Responsibility of the State in caring for human life is emphasized in the following parts of letters from business men:

> "We are surprised that the State of Wisconsin should be so far behind the times in this respect. The protection of these institutions by an automatic sprinkler equipment is a financial saving; as a humane proposition it is a moral obligation. To neglect to protect these unfortunates from fire hazards is little less than criminal neglect. Personally we should not wish to share the responsibility without doing everything to lessen it."
>
> "It is the impression of the writer that if these institutions were owned by private individuals, and there was a risk to human life—as there necessarily must be on account of not having them equipped with fire protection—the progressive element in our State would have insisted that these private individuals should protect human life to the extent of equipping these buildings with the latest fire protection."
>
> "We found that after installing the sprinkled equipment we reduced our rate to one-twelfth of what we were paying prior to the installation. * * * Regardless of the possibility of the destruction of the buildings by fire, we cannot understand how the State can afford to take the risk of the destruction of lives which would undoubtedly occur in case of fire."

Letters that consider both the safety of life and investment features of automatic sprinkler protection follow:

> "Our experience leads us to believe that the State should equip its property with sprinklers at the earliest possible moment, as the saving in insurance premiums alone, we believe, will be a tremendously important item. From the experience of others we also feel that the hazard to life in the various public institutions which you mention will be very materially reduced, and even if there was no money saving whatever, the State owes it to its defectives to give them every possible protection from the fire hazard."
>
> "I am strongly in favor of sprinkler systems, and think they should be installed in the State institutions without further delay. * * * I had the plant here equipped with a sprinkler system three years ago, and the saving in insurance will save the cost of the equipment in six years, adding 5 per cent interest on the investment as well. * * * Besides the certainty of protection against fire, the most important is the protection from loss of life in these institutions."

Advocates of sprinkler protection for State properties in the interest of economy speak as follows:

"Our complete system cost us about $12,000, and the saving on the item of insurance, as compared with what we were paying, will pay for this equipment in four or five years. * * * With the information we have, we would say that the State could make no better investment than to equip her charitable and penal insitutions with automatic sprinklers."

"Our old store had no sprinkler system and so burned down in a night. Our new store has a complete sprinkler system. Insurance rate in our old store was 95 cents and in our new store is 18 cents. * * * We think all State institutions should have sprinkler systems."

The value of the protection from fire is emphasized in this letter:

"We consider the installation of such an equipment an absolute necessity, not only from the point of fire protection, but as a necessity for the safety of the occupants of the various institutions as well. * * * On more than one occasion the * * * automatic sprinkler system, with which our factory is equipped, has saved our plant from destruction caused by small fires which occurred during the night and also during the daytime. We cannot say enough for the installation or recommend a sprinkler system too highly to any and every factory or institution."

Cotton Storage Problem Solved?

"HOW can we procure stable production and more stable prices for cotton so that the world's commerce and manufactures shall not be so often disarranged and made the football of speculation?" asked Lehman Johnson, a cotton and cottonseed specialist, in the *Scientific American,* and answered the question thus:

"The complete solution of the cotton growers' problem will be when there are cotton barns on every cotton farm, in which the cotton may be carried in the seed, that is to say, unginned, and such arrangements made that the cotton shall be ginned as needed for consumption; the gins and the oil mills operating the whole year round, as the cotton mills do. This will require an adequate rural credit system, both based on land and farmers' collective credits and imperishable products. It will also require a national warehouse law, so that farmers in any community can avail themselves of their collective credit and borrow on their cotton, stored in their own warehouses or barns on their own land, with the same facility and at as low a rate of interest as manufacturers and merchants can now borrow on their products stored in their warehouses on the premises."

Mr. Johnson does not complicate his solution by considering the risk of fire, how it shall be insured against and how much this will cost. *Will* money be borrowed under the conditions Mr. Johnson suggests with the "same facility" he remarks? We doubt it, unless automatic sprinkler protection is used in the cotton barns, the same as it is in the other kinds of warehouses—a circumstance Mr. Johnson overlooks.

Sprinklers Reducing Insurance Premium Income

"A MARKED tendency to a reduction in premium income owing to the * * * protection of automatic sprinklers," was remarked by Frank Lock, United States manager of the Atlas Assurance Company of London, in "Fire Underwriting in 1915" in the *Journal of Commerce*. He said:

"In the large cities there is a marked tendency to a reduction in premium income owing to the great increase of areas under protection of automatic sprinklers, to the increase in slow combustion construction, and to the general betterment of water supplies and fire departments, which last have been largely brought about by the systematic work of the National Board of Fire Underwriters' Engineering Department. In the single city of New York it is estimated that the reduction in premium income, due to rate reductions, is not less than $5,000,000, and the tendency to reduction is still unchecked. A similar feature is to be observed in other large cities, notably Chicago.

An Illustrative Instance

"It seems inevitable that the average rate of premium must continue to decline, since the insurable values enclosed within slow combustion walls or which are covered by sprinkler heads are increasing by leaps and bounds, so that it would be a fair estimate that at least 25 per cent of all insurable values are now so protected. One instance which came up recently serves well to illustrate this phase of the business. It is of an individual manufacturing plant carrying $10,000,000 of insurance, for which the premium paid is less than $7,000 per annum. At the average rate of the country that single item would have demanded a premium of over $100,000.

"The average rate," says Mr. Lock, "shows a persistent and uniform decline since 1907, when it stood at 1.14. For 1914 it was under 1.02."

From what Mr. Lock has said it may be inferred that automatic sprinkler protection has had much to do with this reduction of 12 cents in the "average rate," a thing which, to put it mildly, is not of inconsiderable consequence.

Credit Concessions Where Fire Prevention Methods Obtain

"AN idea, I believe, worth developing is that manufacturers and business men who employ fire prevention methods in their premises are entitled to special consideration in the matter of credit."—*Charles E. Meek, New York.*

Mr. Meek is prominently identified with the affairs of the National Association of Credit Men and the National Fire Protection Association, of which he is president.

The Automatic Safety Shower

THERE is hardly any variety of structure, whatever its occupancy, into which sprinklers have not been or cannot be introduced. The most elaborately finished department stores, as well as the plainest factories, hotels, schoolhouses, theaters, and even vessels, have been equipped. The principal Panama-Pacific Exposition buildings have been sprinklered. In some buildings the piping is concealed, but even where exposed it is not objectionably noticeable. How many customers notice the sprinklers in the stores?

A sprinkler in operating will throw 12 gallons of water a minute under 5 pounds pressure, 18 gallons at 10 pounds, 30 gallons at 30 pounds, 40 gallons at 50 pounds, 50 gallons at 70 pounds.

To give a better means of comparison, let us refer to rainfall. The greatest continuous rainfall for ten minutes recorded by the Weather Bureau office at Hartford averaged 0.76 inch per minute. From actual measurement the average distribution per minute on the floor 10 feet below a sprinkler operating at 25 pounds pressure was .0907. That is to say, the downpour from the sprinkler under average conditions is 1.2 times as heavy as our heaviest rainstorms. Under higher pressure it might be twice as heavy.—*Hartford Agent.*

National Civic Federation's Industrial Survey

WHAT employers are accomplishing in the improvement of the working and living conditions of their employees the National Civic Federation is seeking to learn. This effort is termed a social and industrial survey. The vehicle of information is a welfare report. The report mentions many things, among them "Fire Protection," concerning which the following points are covered:

Fire brigade.
Fire drills of employees.
Sprinkler system of extinguishment.
Automatic electric fire alarms.
Enclosed stairways.
Fire escape tower.
Exit doors opening outward.
Chemical engines, type approved by fire underwriters.

DISCUSSING fire insurance rates in New York, Commissioner Robert Adamson said recently that they are the lowest in the country. This statement is supported by a report issued by the Central Mercantile Association, which stated that manufacturers and business men of the city have unequaled opportunities for the storing of goods and the housing of industries under a minimum fire insurance. Which means sprinkler protection.

LEGAL DEPARTMENT

Edited by **WILLIAM LAW BOWMAN, C.E., LL.B.**

Fundamental Rules Governing Contracts

SINCE business is carried on by means of agreements between parties, it is essential that every layman should have a general idea of the fundamental rules governing contracts or agreements. The first question which should occur to the ordinarily prudent man would be, Has the party with whom I am dealing the legal right or power to make a contract? For example, if an infant makes a contract it cannot be enforced as against the infant. In dealing with corporations, either private or municipal, care must be taken to deal only with that agent or officer of the corporation who has legal authority to act for the corporation in the particular matter. Otherwise, a contract made by an unauthorized agent of a corporation would not bind the corporation.

Contrary to the ordinary belief, a contract or agreement made between competent parties is just as good by word of mouth as though written and signed, unless there is some statute which declares oral contracts void or voidable. Of course, oral contracts are not to be recommended because of the difficulty of proving them. Whenever a controversy arises as to what the terms of the oral contract were, there is almost certain to be a wide difference of opinion between the parties on the opposite sides, which always raises a question of veracity to be decided by a jury. As to the kinds of contracts which are not enforceable at law without a writing, probably the most important is that provision of the personal property law which provides that a contract to sell, or a sale of any goods to a value of fifty dollars or upwards, shall not be enforceable by action unless the buyer shall accept part of the goods to be sold and actually receive the same, or give something in part payment, or unless some note or memorandum in writing of the contract be signed by the party to be charged. In other words, this statute requires a writing signed by the party who has to be sued if he neglects to carry out his part of the contract, unless certain other things are done by that party. This defense, used in connection with another fundamental principle of contracts, that there must be a meeting of the minds of the parties, or that they must agree upon the same terms of contract, was responsible for a very interesting law suit, the facts of which can be briefly stated.

The defendant was a drug broker, and he agreed with the plaintiff in a telephone conversation to purchase about a certain quantity of a drug at a specified time, to arrive on or about a specified date. The plaintiff sent the defendant a letter confirming the telephone conversation, and asked him to sign "Accepted" with his signature on an enclosed copy and return. This not being done, a few days later the plaintiff called upon the defendant and received from him a letter leaving out the word "about" in front of the quantity of the drug, and adding "F. O. B. New York." Later, when the plaintiff offered to deliver the goods, the defendant refused acceptance because the market price had dropped. The plaintiff then sold the goods at a loss of several thousand dollars, and sued the defendant to recover his loss. The defendant in his answer set up the defense that the alleged agreement was for the purchase of goods exceeding fifty dollars in value, and that there was no writing subscribed by the defendant. Upon the trial it developed that the basis for this contention by the lawyer for the defendant was because he claimed that the slight changes in the wording of the letter signed by the defendant from the letter of confirmation signed by the plaintiff created a new offer to contract by the defendant, which was never accepted by the plaintiff. However, due to the fact that the court considered these differences not material, and also to the fact that the letter signed by the defendant was personally delivered to the plaintiff, who accepted the same and took it way with him, it was held that that was of itself an acceptance of the agreement set forth in the letter if any confirmation was needed. This shows, then, two ways whereby the defendant intentionally and purposely hoped to defeat and beat the plaintiff should the very contingency happen, as it actually did happen, of a drop in price. By assuming carelessness or forgetfulness, the defendant tried to escape giving any writing signed by himself, and when he did give one, he tried to make sufficient changes so as to enable him to claim that it was a new offer on his part, instead of an acceptance of the offer of the plaintiff. Fortunately, in this case, these plans to defeat justice did not avail, but it shows how some people having a knowledge of the principles of contracts use the same to the disadvantage of those who are not familiar with them.

Bars Oral Agreements

Probably the most serious neglect on the part of the ordinary business man respecting the making of contracts is his failure to remember that where the contract is fully expressed in the writing or agreement that shuts out upon a trial any evidence of any previous agreements respecting the same matter or of other details which were agreed upon and which were not made part of the written and signed contract. Probably one of the most illuminating examples of this is shown by a case where a purchaser, by letters and telegrams, asked a seller whether he could furnish a certain quantity of coal, which must be low in volatile, for a year's contract. The purpose for which the coal was to be used was discussed, and it was stated that the ultimate consumer was changing coals because of the fact that the coal then in use was not sufficiently low in volatile. The seller stated he could furnish that kind of coal, and sent forward a year's contract for signing, which merely specified that he would furnish a certain coal coming from certain mines, and saying nothing about the question of volatile. After sufficient coal had been furnished to show that it was not as low in volatile as was required, and understood by the purchaser to be furnished, he complained and was advised that he was getting the coal specified in his contract. He then called attention to his letters, showing that the only coal that would be suitable was that of a certain character and that they, in offering to furnish the same, had apparently offered a coal of the required characteristics. The ultimate consumer refused to take the coal from the purchaser, so that the contract was broken, and the seller sued the purchaser for the loss of profit. The case was ultimately settled by the purchaser paying a good part of the loss of profits claimed by the seller; but to this day you cannot argue with him why he should not have been permitted to show the question of low volatile, which was not specified in the contract, but which was so clearly required in his letters.

Those having a knowledge of this rule of evidence make considerable use of it in carrying on their wrongful plans and schemes. The way it is usually accomplished is by agreeing that a certain thing shall be done, and then when it comes to writing and signing the formal contract that particular phase of the situation will be left out because the scheming party will say we have already agreed about that and there is no need of putting that in this agreement.

In consideration of the foregoing statements, it is very apparent that a contracting party should realize the following:

First—Know that the other party is competent, or has a legal power to contract.

Second—Oral or spoken agreements are just as good as written ones, provided you can prove them, unless there is some statute specifically requiring a written contract or signed acknowledgment of some sort.

Third—That if the contract or agreement is oral or by correspondence there is no contract made unless the acceptance is in the same terms as the offer.

Fourth—That where the agreement is put in writing, everything that is agreed upon, or important, must be contained in that writing, since you will not be able to prove previous oral agreements not contained in the writing.

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Is Contractor an Insurer?

It has been learned from a reliable source, says the *Journal of Commerce*, of New York City, that a certain large contracting concern has required the inclusion of a clause in its contracts with all sub-contractors, calling for the payment by the sub-contractor of 15 cents per $100 of contract price to cover the cost of carrying contingent liability insurance. The clause reads as follows:

"It is further understood and agreed that the sub-contractor shall pay to the contractor the cost of carrying contingent insurance against the liability of the contractor growing out of the work to be performed hereunder."

The contractor in question has recently arranged to become a self-insurer under the workmen's compensation act, so that under the terms of this clause required in contracts with the sub-contractors the question is raised as to whether the contractor becomes an insurer. It is pointed out that the workmen's compensation law gives those financially responsible the right to become self-insurers, but makes no mention of their having the right to become insurance carriers for their sub-contractors.

◆

ONLY a rich man can afford now to build his home of wood. The man who is not financially independent can't afford the expense of upkeep and the rapid depreciation of the frame house. He must put his money into a home of permanent materials that will not require paint and repairs and which will not absorb the increased value of the improved land.

New Literature in the Field of Building Con-

Reviews of Books, Catalogs and Other Literature Which Should Be

THE *Fire Marshal Bulletin,* issued by the Fire Marshal Department of South Dakota, M. Harry O'Brien, Insurance Commissioner, contains the following excellent advice to fire chiefs:

"Will you help in the effort of awakening the people of this country to our stupendous fire losses and their economic significance? Of course, your answer is in the affirmative.

"You can do more to aid the movement in your community than anyone else. It is not enough that you and the men in your department thoroughly realize the waste of property and the loss of lives through preventable fires, carelessness and neglect. Educate the whole people to a realization of the crime of harboring hazards, and to exacting personal responsibility for preventable fire.

"To do so use your local papers. Arouse your local editors to a realization of their duty in this matter.. Call to their attention every week some news item, some comment, some paragraph that will stimulate their thoughts along the line of fire prevention. They will do the rest. Clip and ask them to print every item that you see that has tendency to help in the awakening. Clip and clip and clip; you will soon make Fire Preventionists out of your newspaper men, and they in turn will make the country such."

Fire Prevention Prints

SOME time ago the German American Insurance Company, 1 Liberty Street, New York City, issued an interesting and instructive book of standard fire prevention and protection designs by Charles C. Dominge, insurance engineer.

These prints cover a variety of forms of firesafe construction and protection and to them has recently been added drawings for standards on roof construction and broken plaster, pages which fit into the original loose-leaf book.

Those interested in firesafe design for building construction are advised to send to the German American Insurance Company for this excellent book of designs, which is furnished without charge.

Topics for Fire Prevention Meetings

THIS booklet, containing information designed to assist local organizations in considering the subject of Fire Prevention and in the arrangement of their meetings, may be obtained by addressing Franklin H. Wentworth, Secretary National Fire Protection Association, 87 Milk Street, Boston, Mass.

"The gradual awakening of the people of the United States and Canada to our stupendous fire losses and their economic significance is stimulating public meetings on this important subject. Chambers of commerce, boards of trade and other business and professional organizations and college, church and women's clubs are now constantly applying to the National Fire Protection Association for information and advice as how best to present the topic in order to awaken interest and obtain results. The accompanying list of subjects for papers or addresses is suggested to meet this growing need."

THE November issue of *Atlantic Terra Cotta,* a richly illustrated monthly publication for architects which is distributed by the Atlantic Terra Cotta Company, of 170 Broadway, New York, features the reconstruction of store fronts and the excellent aesthetic effect obtained by the use of ornamental terra cotta.

Holiday Fire Bulletin

THE fire dangers incident to the mid-winter holidays are graphically illustrated in this Bulletin under the headings "Warnings for Stores, Churches and Bazaars" and "Warnings for the Home."

Those who are interested (and who is not?) in the prevention of fires in the home or in other places of holiday activity will do well to write to the National Fire Protection Association, Boston, Mass., for a copy of this Bulletin; or, in case a number are desired for distribution, they may be had at the nominal price of $1 per hundred or $7.50 per thousand.

THE Underwriters' Laboratories, Chicago, has issued the "List of Inspected Electrical Appliances," which is a supplement to the April, 1916, list and has a gummed back cover for insertion inside the front cover of the April list.

Be Careful

AN interesting warning in booklet form which is being distributed by the Society Advocating Fire Elimination, Cleveland, O.

"National annual toll of carelessness—2,000,000

All literature described above is free of cost unless otherwise designated

struction, Fire Prevention and Protection

in the Files of Every Architect, Contractor and Prospective Builder

persons injured—35,000 persons killed—$500 in property burned every minute" is the arresting statement on the cover page.

Safe and Sanitary Hospitals

FROM the Associated Tile Manufacturers at Beaver Falls, Pa., has been received a remarkably well written and well illustrated brochure, *Tile Floors and Walls for Hospitals.*

An interesting feature of this book is headed "Tile for Fireproofing," and comments as follows:

"Tiling a hospital means fireproofing it, and positive assurance for the safety of property and patients, because tile is absolutely fireproof, prevents many a fire and hinders the rapid spread of flames.

"No building is more fireproof than its floors and walls. Combustible and semi-combustible materials should not be used in a hospital—otherwise 'fireproof' becomes a misnomer. There is but one principle to fireproof construction—incombustible material.

"The subject of fire prevention is of vastly greater importance than that of fire-fighting. The rapid spread of flames must be prevented and actual safety from fire provided by unburnable construction. Elaborate fire-fighting apparatus and fire escapes cannot accomplish this, and to helpless patients fire escapes are of little use. By this is not meant that there should be no fire apparatus or fire escapes whatever, but that they are of very much less account than preventive measures. It is obviously safer to prevent a fire than to fight it, or try to escape from a burning building.

Aside from the humane aspect of fireproof construction, there is, in addition, an economical side worthy of consideration. The money which is fed to the flames is beyond recovery. Insurance seldom covers the loss, and is little consolation. Usually, we realize the necessity for fireproof construction and protection for property only when we consider the fact that the fire loss in the United States each year is one-half the value of the buildings erected in that time."

A registered copy of this valuable addition to an architect's library will be sent on application and without charge. Additional copies 50 cents.

THE Portland Cement Association has just issued *Recommended Specifications for Reinforced Concrete Design,* based on the regulations in the building code recommended by the National Board of Fire Underwriters and the 1916 report of the joint committee on concrete and reinforced concrete.

These specifications are recommended for use in designing buildings of reinforced concrete to be erected in the cities not having a building ordinance.

THE *Easton-Allentown Concrete Road,* as described by the State Highway Department of Pennsylvania has also been issued in booklet form by the Portland Cement Association, 111 West Washington Street, Chicago.

A BOOK of descriptive text and photographs which illustrate the economy and adaptability of Blaw Steel Forms for concrete work of all kinds is *Blawforms,* a 128-page brochure which should be in the consulting files of every architect and contractor. The intent of this volume is to suggest to contractors and engineers the many economies effected by the use of these forms in every type of concrete construction. It contains illustrations which show many of the 20,000 contracts on which Blawforms have proved their value. Among these are the Panama Canal, New York State Barge Canal, the Catskill Aqueduct, the Winnipeg Aqueduct, subways in New York and Boston and sewer systems in New York, Chicago and other leading cities. Address Blaw Steel Construction Company, Pittsburg.

We will gladly review any new book, catalog or other literature relative to safe and sensible building construction.

All literature for this department should be plainly marked "For New Literature Department."

All literature described above is free of cost unless otherwise designated

Shreveport's Useless Building Code

NOT satisfied with having refused to safeguard their city from the conflagration hazard by barring the wood shingle roof, the city fathers in Shreveport, La., have calmly ordained that some of their children shall be forced daily to undergo the peril of death similar to that of the little ones burned in the St. John's Parochial School fire at Peabody, Mass.

The ruins of this horror should, it would seem, serve as a sufficient barrier against the encouragement of a repetition; but in spite of this, upon application of the Caddo Parish School Board, which explained that the desired concession would mean a saving of at least $10,000 in cost of construction, the City Council last month made an exception under the municipal building code and granted permission for a *wooden* high school structure to be erected.

Remember, Shreveport, that it was the wood in a school structure that caught the sparks to create the second Salem conflagration. Remember the men in your Council who are passive potential murderers in that, with their eyes open, they throw wide your gates to the destroyer—conflagration!

When Augusta, Ga., recently extended the limits in which the criminal wood shingle roof might be used (just before the conflagration), CONSTRVCTION, under the heading "The Shame of Augusta," warned of the fate to come—and it came on the day that issue reached the post office at Augusta!

Is Shreveport waiting for the lesson to be burned in?

Sheet Metal Fire Door Recognition

THE growing importance and use of sheetmetal fire doors is becoming widely recognized, it is stated by the Merchant & Evans Company, of Philadelphia, and, in addition to the approvals they received from the Underwriters' Laboratories, of Chicago, and the Factory Mutual Laboratories, of Boston, as well as endorsements or approvals from National, State and municipal authorities, this company invites attention to the fact that they have just received an engrossed certificate of approval from the Industrial Board of the Pennsylvania Department of Labor and Industry, State of Pennsylvania.

The Merchant & Evans Company has over 160 experienced contracting and erecting licensees established throughout the United States, through whom the company is receiving a large amount of fire door and fire shutter business; and they wish to announce to the trade that in addition to the standard single swinging and single and double sliding types of doors, and the single and double swinging shutters that they are regularly manufacturing of the Evans "Almetl" type, they are prepared to meet many unusual requirements, such as supplying their product made of galvanized American ingot iron or painting the inside surface of the panels with specified paint. They also supply swinging or sliding doors with well designed panel frame, set into and securely bolted to the door, to hold wire glass. Likewise doors with offsets to protect openings that have a monorail trolley track running through at the top. They likewise furnish swinging flush type doors with a frame at the top made of an arched segment and shaped to properly fit into arched top openings.

Merchants & Evans Company have plants in Philadelphia, Warwood (a suburb of Wheeling) and Chicago. They also have offices and warehouses in Philadelphia, New York, Baltimore, Atlanta, Cleveland, Wheeling, Chicago, St. Louis and Kansas City.

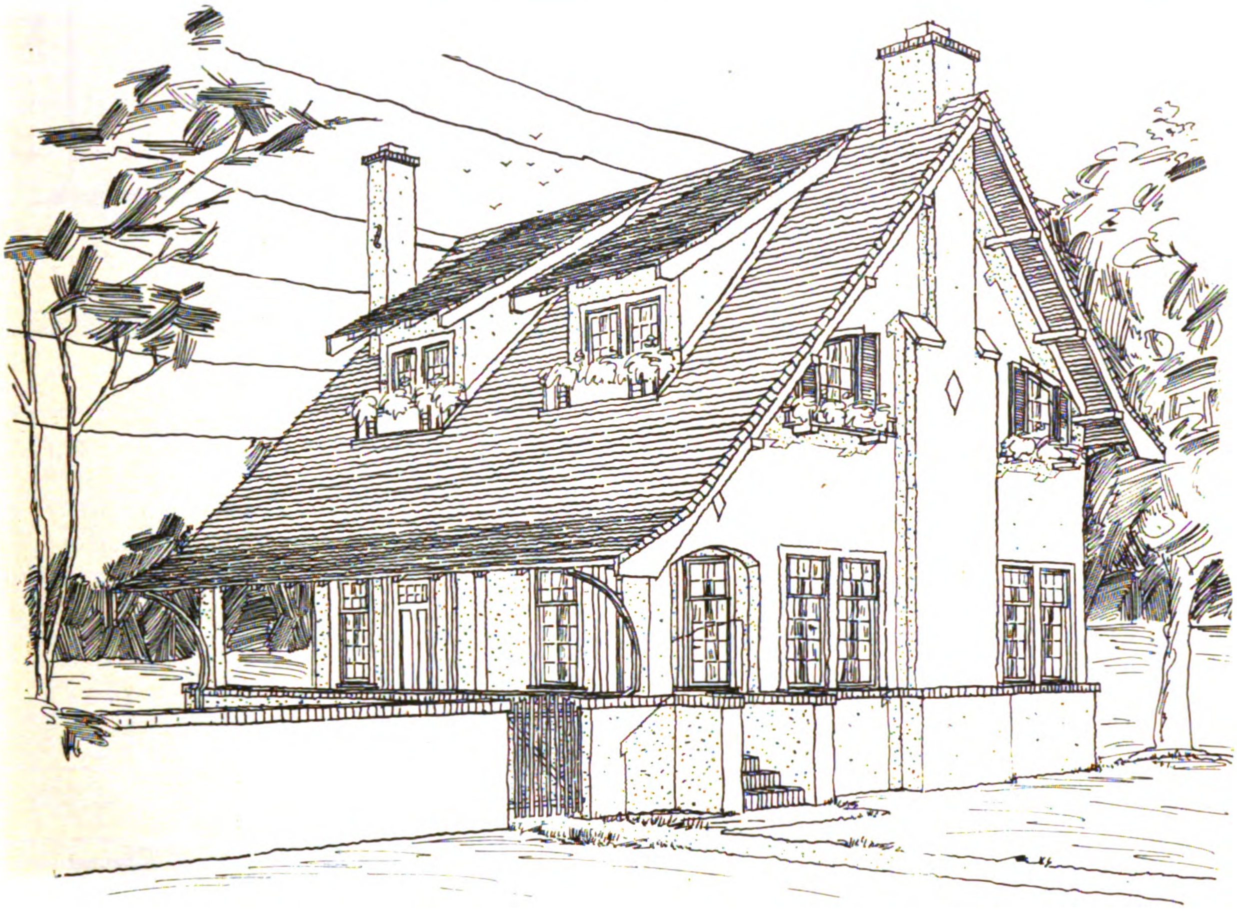
THE American Society of Agricultural Engineers will hold its annual convention in Chicago, December 27-28, inclusive. The convention will be opened by A. J. R. Curtis, director of the Extension Division, Portland Cement Association, who is chairman of the local arrangements committee of the American Society of Agricultural Engineers. Mr. Curtis will read a paper entitled "College Instruction in Concrete Construction," with special reference to the needs of agricultural colleges. The Educational and Farm bureaus of the Portland Cement Association will have several representatives present during the various discussions while the American Society of Agricultural Engineers is in session, particularly when farm structures are the subject, which will be on the afternoon of December 27.

THE Extension Division of the Portland Cement Association is planning to entertain a party of 100 or more prominent farmers of Virginia, headed by Governor Stewart and accompanied by a number of county agents, who will be in Chicago December 6 and 7, attending the National Live Stock Show. The party will be conducted from Chicago to the surrounding dairy districts in the vicinity of Elgin and Barrington, Ill., so as to give them an opportunity to visit a number of farms where extensive concrete improvements, such as silos, dairy barns, barnyard pavements, etc., have been built.

LEWIS R. FERGUSON, of the Portland Cement Association, is accompanying R. J. Wig, of the United States Bureau of Standards, on a trip along the Atlantic and Pacific coasts for the purpose of examining various concrete structures exposed to sea water.

SAFE HOMES

Edited by **RALPH P. STODDARD, Secretary**
Society Advocating Fire Elimination



A Semi-Bungalow

WHILE this little house of bungalow type* departs radically from the usual practice, it offers many advantages in meeting a number of requirements.

First of these is the downstairs chamber, which may be made to do duty as a den or sickroom. The large upstairs room, which combines bedroom and playroom for children, also is an exceptionally valuable feature of design.

The combined living and dining-room is another feature growing in popularity, which the architect, A. F. Keyman, Milwaukee, Wis., has incorporated in his design. This gives the maximum efficiency for a prescribed space.

About $4,000 should build this home in cities of about the size of Cleveland, Pittsburgh or Detroit.

◆

FRAME buildings—either home or commercial structures—are poor assets for any city. Their rapid depreciation means a loss in tax values. What is the result? Tax rates have to be raised until in many cases home owners pay taxes on more value than they possibly could obtain for their properties.

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* See floor plans on page 372.

AMERICANS—except in a very few cities—are a race of "movers." The first of every May and October finds the streets crowded with moving vans. The reason is the lack of "homes" for which this country is conspicuous. The frame house is at best a mere "stopping place" for a few years, until it is so run down and has absorbed so much in upkeep and depreciation that the owner's only salvation is to sell—even at a sacrifice—and buy or build a new home. And he does the same thing over again, without ever giving a thought to building of permanent materials, which also are Safe.

◆

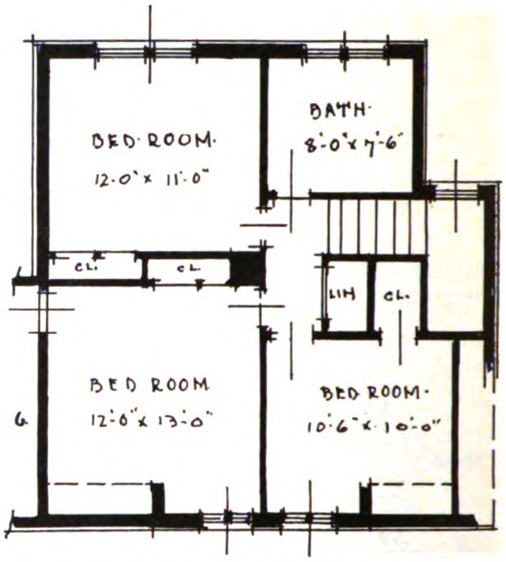
REAL estate men agree that land will increase 10 *per cent a year in any growing neighborhood. Very well. But what if you have on your land a frame house that eats up this increase in upkeep—painting and repairs—as fast as made? Engineers declare there is no depreciation in a house of Safe materials during the first five years. How much would you be ahead if your house was of this type?*

◆

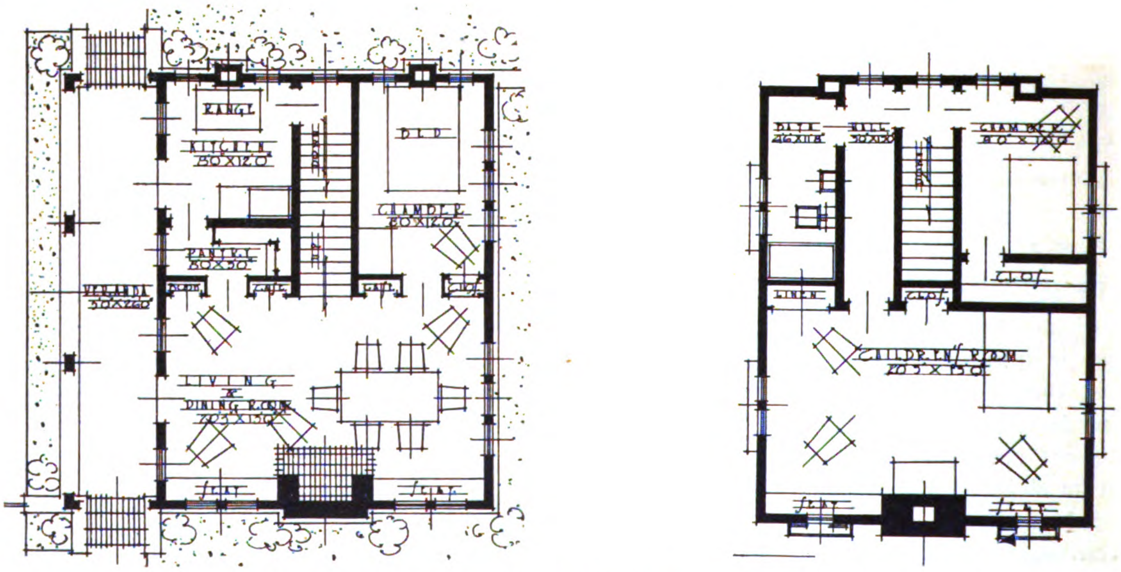
UPKEEP expense is the usual objection raised against home owning. In fact, it is the only valid reason for renting. The house of Safe materials removes this objection. It does not need continual repairs to its exterior. It does not need to be painted. It withstands all climates and increases in beauty with the years. And it is warmer in winter and cooler in summer.

◆

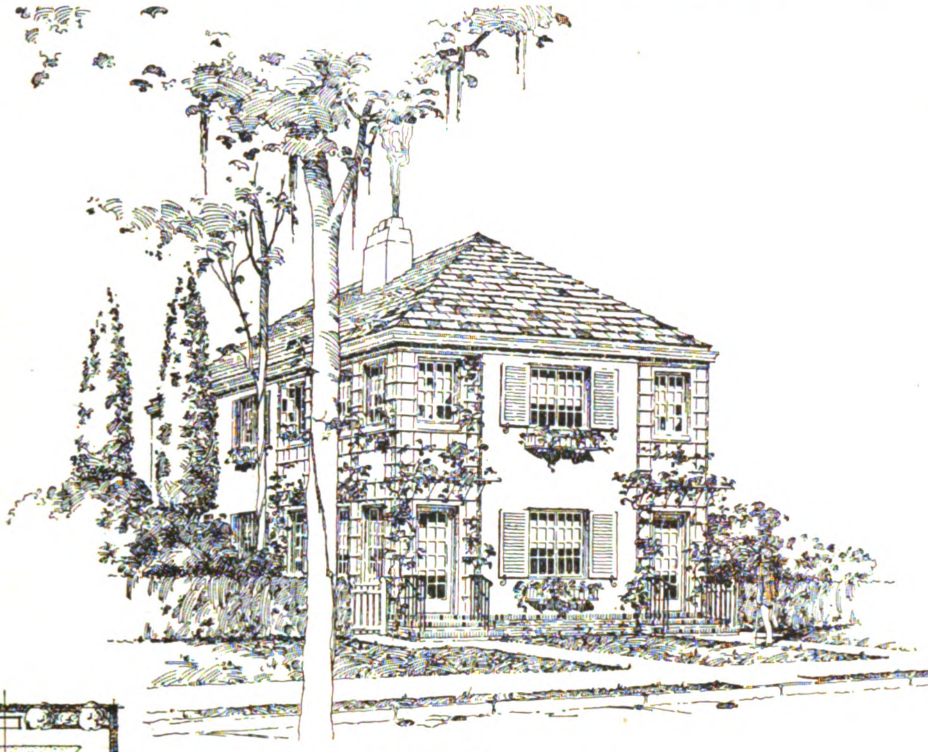
A VALUABLE guide to builders is shown in a recent report of General Manager Allard Smith of the Cleveland Telephone Company, who finds from a survey conducted by his company that of the 850,000 *people in Cleveland and its suburbs only* 46 *per cent, or less than half, live in single houses. Multi-family buildings, which include all manner of flats and apartments, house* 54 *per cent of the population. Of the renters,* 43 *per cent pay less than* $15 *per month and* 4.2 *per cent more than* $50 *per month. The remaining* 52.8 *per cent, therefore, or more than half, pay from* $16 *to* $49 *per month.*

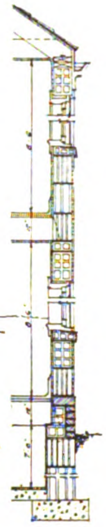


Second floor plan of house shown on page 374



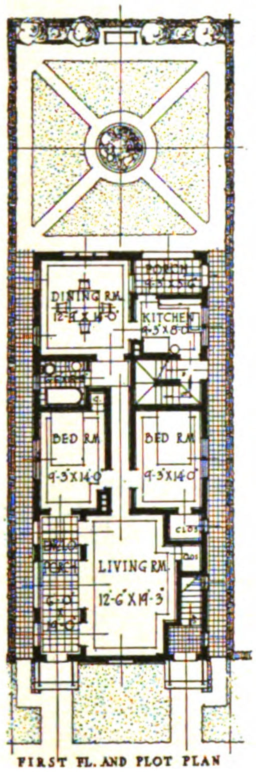
Floor plans of semi-bungalow shown on page 371



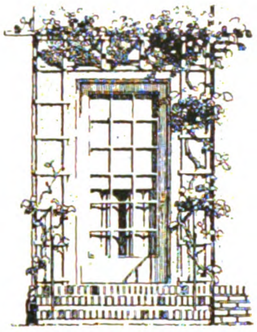


CVBAGE

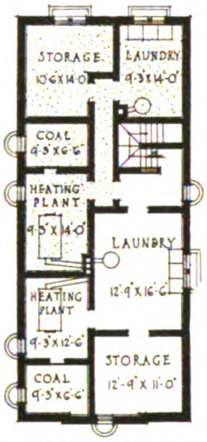
WIDTH 24'-0" - LENGTH 56'-6"
HEIGHT FROM BASEMENT FL.
TO AVERAGE HEIGHT OF ROOF
31'-0" - TOTAL CVBAGE 42,036
CVBAGE OF FRONT PORCHES 2,340
CVBAGE OF REAR PORCHES 1,080
¾ TOTAL CV. OF PORCHES = 2,565
42,036 - 2,565 = 39,471 CV. FT.



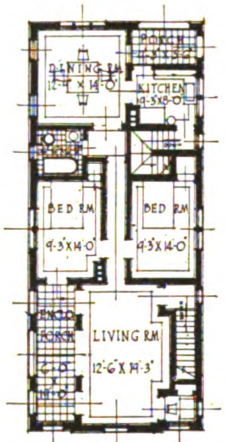
FIRST FL. AND PLOT PLAN



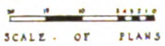
DETAIL OF ENTRANCES



BASEMENT FLOOR PLAN



SECOND FLOOR PLAN



House for Two Families

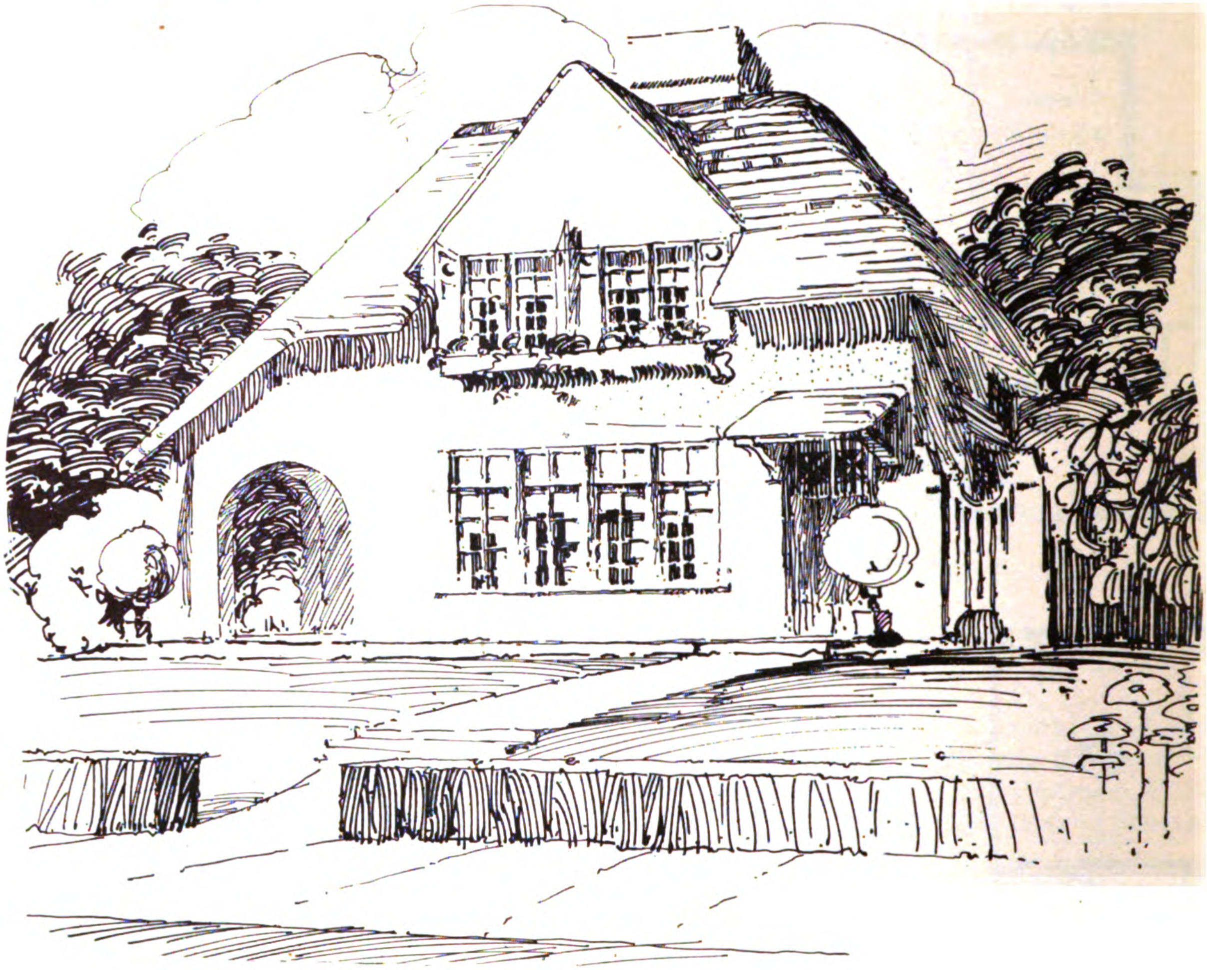
THE two-family house is one which is daily gaining in popularity. It offers a home for the owner and an income as well. As a buying proposition, however, it is suffering from speculative activities. The flimsy materials of which the great majority are built mean a continual upkeep that cuts largely into the year's earnings.

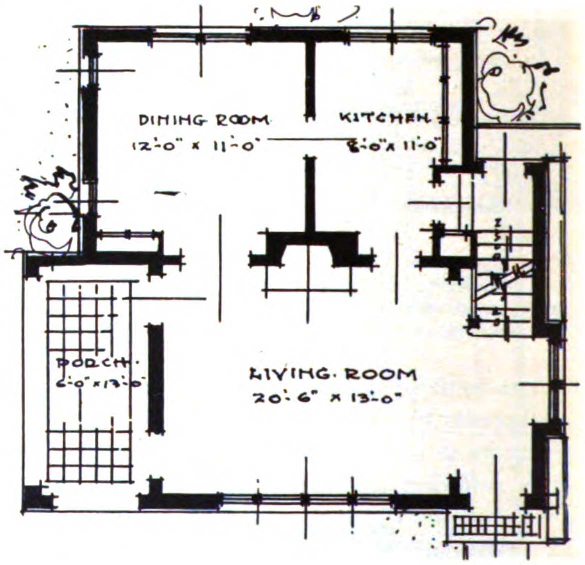
For this reason more people are every year turning to buildings of permanent construction.

The house shown in the accompanying cut will offer a suggestion for those desiring a high-grade investment. It is one of the prize designs for a competition held recently by the National Fire Proofing Company, which has gathered them together into an attractive booklet.

The separate stairways and the enclosed porches are but two of the many good points of this design, apparent from a study of the plans.

The National Building Exposition, *to be held in New York City, March 5 to 11, 1917, already promises to be the greatest building show ever held.*





House for Wide Lot

FOR a prospective home-builder not restricted to the confines of a 35 or 40-foot lot, the house shown in the accompanying cut offers an interesting suggestion.

While a frontage is only 30 feet, the open space on either side should not be less than 10 feet to insure the requisite amount of privacy.

Of the many features which commend this plan, the recessed porch, which may be enclosed in screen or glass, and the exceptionally large living-room will particularly appeal to the average home-builder.

Estimates upon this house, based upon increased cost of materials and labor, are in the neighborhood of $4,500 in or near large cities.

P. L. Small and O. J. Ochert, Cleveland, are the creators of this design.

(The second floor plan will be found on page 372)

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., December, 1916 Priceless

THE WOODEN SHINGLE

In the battle against the use of the dangerous wood shingle, it is interesting to note the persistency with which the lumber interests continue to fight for their product after it has been ruled against. The passing of an ordinance revising the building code so that wood shingles are prohibited but stirs them on to repeated counter attacks having the purpose of re-establishing old laws or effecting their modification in some way to allow the use of inflammable roofing.

Last month, while failing in their battle to obtain a repeal of the anti-wood shingle ordinance at Birmingham, Ala., the lumbermen did succeed in gaining a modification of the code and, of course, manifest considerable pleasure on the victory. The amended ordinance allows that wood shingle roofs may be repaired with similar material if the damage does not exceed twenty-five per cent of the total area of the roof.

Birmingham Law Amended

Birmingham has had a bitter and expensive experience with wooden shingles. That the lumber interests succeeded only in bringing about the cited amendment and not repealing the law is due in a very large measure to the strong opposition of S. A. Middleton, Fire Chief, whose activities against the proposed abolishment of the safety measure influenced the councilmen in throwing out the many fluent though entirely specious arguments of the advocates of lumber.

Firesafe Roofing Victories

On the other hand many worthy gains have been achieved by those who appreciate the menace of the wood shingle roof. An ordinance has just been passed at Texas City, Tex., prohibiting the use of any but firesafe materials for roofs, and also providing that roofs damaged to the extent of twenty-five per cent or more must be repaired with fire-resistive roofings.

The Grain Dealers' National Mutual Fire announces it will not insure elevators covered with wooden shingles.

In their international conference at Providence, R. I., fire chiefs pledged their support in securing legislation to do away with the wooden shingle roof.

When Deeds Belie Words

Meanwhile a report arrives showing that the lumbermen themselves have no faith in their product for roofing purposes—at Freiburg, La., the Freiburg Lumber Company and the Lyon Lumber Company have had their entire plants roofed with firesafe roofing; and these are but two instances out of many where lumbermen have selected firesafe coverings and excluded wooden shingles, thus taking no chances on the very product which they try to have enforced, through legislation, upon any community which is foolish enough to listen to the illogical arguments offered by representatives whose only resort—a final one—is to befuddle unthinking minds with their purposely distorted data and statistics.

◆

Interstate Commerce Commission granted request of Seaboard Air Line Railway for relief from requirements of fourth section of the Act to Regulate Commerce on rates on cement from Southern points to Wilmington.

◆

Fisk & Co., Inc., Boston, Mass., and New York, N. Y., which leased the plant of the Keystone Brick Company, Watsontown, Pa., will invest $25,000 in improvements there, doubling the present capacity and manufacturing building brick instead of the former product of the Watsontown plane, which originally made paving brick.

CONFERENCE ON FIRE TESTS

Representatives of various technical associations held a conference at the United States Bureau of Standards, to prepare a comprehensive programme of fire tests for building walls and partitions. Attention was centered on metal lath and plaster, gypsum, hollow-tile, stucco, brick and concrete partitions and walls.

The tests outlined are to be conducted with the panel furnace recently installed by the Bureau, which is the largest and most complete plant ever constructed for such work. The committee believes these tests will have an important relation to fire-resistive building.

Taking part in the conference were delegates from the following bodies: American Institute of Architects, National Board of Fire Underwriters, American Society for Testing Materials, Associated Metal Lath Manufacturers, Gypsum Industries Association, National Brick Manufacturers' Associations, Portland Cement Association, Fire Underwriters' Laboratories, American Concrete Institute, National Fire Protection Association, and the National Lime Manufacturers' Association.

◆

He who doesn't prepare for the future is preparing for trouble.

◆

ROENTGEN RAYS ON REINFORCED CONCRETE

The experiments of Inspecting Engineer E. Stettler, Swiss Railway Department, in photographing reinforcing in concrete structures with Roentgen rays, are set forth in a recent United States Commerce report. The advantage of such an idea, if successful, lies in the fact that it will permit a knowledge of the precise size and location of the reinforcing of concrete structures without destroying any of the members.

Looking Ahead!

¶ Ninety-nine per cent. of all new building construction is not actually firesafe—

¶ —because proper fireproofing materials and protective devices are not purchased and properly employed.

¶ CONSTRUCTION is encouraging more stringent fire safety laws—bringing home to architects, owners and prospective builders a realization of the value of consistent firesafe materials—

¶ —developing a vast market for

CEMENT BRICK TERRA COTTA
GYPSUM STEEL HOLLOW METAL

METAL FURNITURE
FIREPROOF DOORS AND WINDOWS
FIRE SHUTTERS WIRE LATH

AUTOMATIC SPRINKLERS
CHEMICAL EXTINGUISHERS
FIRE ALARM SYSTEMS

This is *your* work and should be supported when your 1917 advertising schedule is laid out.

The International FIRESAFE *Building Publication*

CONSTRUCTION

The *only* publication *exclusively* devoted to consistent, firesafe, building construction.

FIRE PREVENTION DAY

Reports from all over the country indicate a wide observance of October 9 as Fire Prevention Day. With a full realization of the constructive service of such a movement, President Wilson, October 8, in response to an invitation of the Safety First Federation, issued a proclamation to citizens of the United States, as follows:

"Let the people observe Fire Prevention Day by a general cleaning up and removal of all debris, rubbish and inflammable material; also let all chimneys be carefully gone over and placed in proper condition for winter use.

"Let all public and private institutions, hotels, asylums, factories and theatres be carefully looked over on that day and, when necessary, let changes be made that will further promote the safety of occupants.

"Let local authorities give attention to the matter of better building regulations, fire protection and prevention, as well as added apparatus for fire-fighting.

"Let fire drills be set on that day in institutions and practiced in public, private and parochial schools, and let teachers in the public schools instruct their pupils, through short talks and proper programmes, on the danger of fire and the simpler means of fire prevention.

"Let a campaign of education along the lines of fire prevention be instituted in every factory, public building, theatre or place where people live or congregate.

"Let publicity through the State and national press associations by timely news articles pertaining to fire prevention and fire protection be spread broadcast throughout the country."

Official Co-operation

A majority of the governors issued state proclamations asking mayors, state and municipal officials generally to observe the day with proper exercises in schools; civic celebrations, parades, fire drills and newspaper and magazine publicity, were among the ways adopted to call attention to our enormous annual fire loss. Thousands of pieces of printed matter were distributed by the Safety First Federation of America, National Fire Protection Association and the National Safety Council. The Fire Department of New York City published 250,000 circulars. The Safety First Federation of New Jersey sent out 120,000 circulars. John A. O'Keefe, Boston's Fire Prevention Commissioner, reported that a member of the Fire Department inspected every school house and gave numerous addresses on the subject of fire prevention. Factories, large department stores and other places gave special drills. The press of the country generously responded with notices. Many chambers of commerce held special meetings and in other ways actively lined themselves for the movement. That the work has already resulted in the avoidance of many fires and that it is of incalculable educational value is beyond doubt.

◆

Motor financing—building more expensive homes so they can be mortgaged for more expensive cars.

◆

Co-operation offers sufficient glory for all.

◆

Claiming that Oklahoma brick makers are given an advantage over Texas companies by the requirements of Fonda's tariff, 2-B, the Texas Brick Manufacturers' Association, in session recently at Fort Worth, asked the Interstate Commerce Commission to suspend the tariff.

◆

Despite unfavorable conditions in Mexico, Governor Gustavo Espinoso Mireles, State of Coahuila, is rehabilitating Saltillo, the capital city. One of his activities is the building of a great public school, to cost $350,000 and to be constructed of brick from a modern plant which has been established for the purpose at Saltillo.

◆

The United States Government is to begin construction of an extension of the sea wall at Galveston, Tex., in order to protect the military reservation. $200,000 will be available for the work as soon as 600 acres near Fort San Jacinto have been acquired by the Government. Major E. N. Johnson, United States engineer, will have charge of the work. The material will be concrete.

NEW RUTGERS CERAMIC DIRECTOR

George H. Brown, Cr. E., has assumed the directorship of the ceramic department at Rutgers College. He was formerly assistant ceramic chemist with the United States Bureau of Standards at Pittsburgh, Pa. The position he now holds at New Brunswick, N. J., was open for several months and was formerly occupied by Professor Cullen W. Parmelee, now on the ceramic teaching staff at the University of Illinois.

Mr. Brown completed the course in ceramic engineering at Ohio State University in 1909. While at college he enjoyed two years of practical work with the Hydraulic Press Brick Company, Washington, D. C. During the seven years he was connected with the Pittsburgh Bureau of Standards, he was actively engaged in many of the important researches conducted there. He is the author of several books dealing with ceramic problems, and has in numerous instances successfully applied new processes and developed new products. Mr. Brown has been elected a trustee of the American Ceramic Society.

Rutgers College is to be congratulated in securing the services of an engineer so well qualified for his new post.

◆

Barber Asphalt Paving Company will supply 3,000,000 slate surfaced asphalt shingles to roof permanent frame dwelling houses and hospital buildings on the Panama Isthmus.

◆

Board of Water Commissioners, Temple, Tex., have adopted plans for construction of concrete water storage reservoir, with a capacity of 4,000,000 gallons.

Southern Cotton Compress Company, Galveston, Tex., is to erect a concrete fire wall and concrete sheds and platform at its compress.

◆

San Benito Land & Water Company, San Benito, Tex., is to spend about $250,000 extending its $1,500,000 irrigation district. Concrete conduits and gates are to be built and portions of the ditch system will be lined with this material. The additional pumping machinery and combustion engines will rest on concrete beds.

Less than 5%

of the building of the U. S. is consistently fireproof.

That's the claim of the manufacturers of Firesafe materials and equipment. It also is their claim that the country's best engineers say that the consistently firesafe building is cheaper in the long run.

EDUCATION IS NEEDED!

The best opportunity for Education is offered the manufacturer and dealer in

THE NATIONAL BUILDING EXPOSITION

Grand Central Palace, New York

March 5, 6, 7, 8, 9, 10, 11, 1917

Thousands of builders, contractors, engineers and architects from all parts of the country will attend this big Exposition daily—many trade conventions will bring them to New York.

Make reservations at once—
First floor already 50% sold

Eastern Office:
GRAND CENTRAL PALACE
NEW YORK

Western Office:
352 LEADER-NEWS BLDG.
CLEVELAND, O.

MUST PREACH IN FIRESAFE TABERNACLE

"Billy" Sunday, dispenser of religious hot stuff, is conducting a ten- or twelve-weeks' campaign at Boston, Mass., which began November 12; and if the national terrifier of "hogged, jeweled and putty-colored fakers" does not, in years to come, recall the Citadel of Baked Beans as a harvest ground of "those who hit the sawdust trail," he will think of the Hub as the first spot which refused his application for the erection of one of the flimsy fire traps he has been accustomed to gather human beings in, to save their souls from fire and subject their physical beings to its consuming force, but compelled the one-time baseball player to build his tabernacle of substantial materials.

If no disaster has occurred in the past at the Sunday gatherings it is more than likely due to the fact that an all-wise Providence took greater care of Billy's religious devotees than did Billy himself.

As a result of the most highly commendable action of the Board of Building Commissioners of Boston, Mr. Sunday is now shouting his religious prescriptions, freely damning sinners and gathering in the good old shekels in a structure covering an area of 250 by 300 feet, seating over 15,000 people, the largest and best tabernacle yet constructed, the supporting walls being of hollow tile and the interior supports of steel up to a height of 7 to 12 feet, making the building comparatively safe—and, thanks again to the far-sighted building authorities, far, far better than the dangerous flimsy wooden structures temporarily shot up for Bill Sunday in other cities.

But "Billy" has clear-headed business men representing him. Now that the tabernacle is up, they appreciate the advantages of this type of structure, and are likely to vote for firesafe materials when they move on to other quarters. If his present plans are adhered to, Billy will provide religious entertainment for New Yorkers next spring, when he will storm the Empire City, determined to reap the usual harvest of dollars and converts. From Boston he goes to Buffalo; after which the sinners of New York will be shown how to balance their spiritual ledgers. That New Yorkers need religious salve is evidenced in the fact that Mr. Sunday intends to "hold services" there for a longer period than any other place heretofore visited, and sin-ridden Gothamites will have a chance to listen to the trenchant voice of the great evangelist-financier as he rises majestically on his favorite kitchen chair and says, "Brethren we will rise and sing 'Hallelujah, I am Coming,' while the ushers will *go through* the audience."

Reports state that $1,000,000 is needed to carry on the Boston campaign. Besides the tabernacle a number of other buildings are needed, such as a restaurant and lunch room, emergency hospital, post office, book rooms—and special quarters for Brother Sunday and his associates, which will be equipped with bath rooms and other conveniences. Everything considered, it is a wonderful business undertaking.

◆

It's the slippery deal we get stuck on.

◆

He who doesn't catch his own errors generally "catches it."

◆

Responsibility is the ability to respond to expectations.

◆

RAILROAD SEIZES BRICK PLANT'S COAL

In a provision of the interstate commerce law, railroads are permitted to seize coal freighted over their lines for their own use. The Big Four Railroad confiscated three carloads of coal intended for the Barkwill - Farr Brick Company, Cleveland, Ohio, and the brick company's attorneys have started proceedings in the courts of Cuyahoga County, Ohio, to contest the right of the railroad. The agent of the road advised L. B. Koblitz, treasurer of the Barkwill-Farr Company, to return the invoices to the shippers. Instead the battle was started to test the legality of the action in these times. Robert C. Mitchell, sales manager of the company, states that the firm stands to lose several hundred dollars, the coal costing $2.90 a ton on contract, while now the open market prices are around $6.

TENTH CEMENT SHOW ASSURED SUCCESS

The Cement Show, which has been held in Chicago nine successive years, will occupy the Coliseum and annex for its tenth exhibition, February 7-15, 1917. The number and character of exhibits, for which space has already been reserved, insure its success.

It is an interesting fact that beside the Cement Show only two of the other trade shows held at the Coliseum have reached the ten-year mark.

The Tenth Cement Show will be housed under one roof, making necessary the use of the balcony as well as the main floor and annex of the Coliseum. Applications have been made by prospective exhibitors for sixty balcony spaces in addition to all the main floor and annex.

The exhibits assigned to the balcony would make a fair-sized cement show in themselves. Because of the impracticability of placing heavy exhibits in the balcony it was necessary to assign the lighter exhibits there. They will make an interesting and attractive display.

The exhibits as a whole are representative of the cement industry and allied interests to even a greater extent than those in previous shows. Road-building machinery and equipment particularly will form interesting and instructive features of the show. These include road-crushing machinery, sand and gravel screens and washers, storage bins, car unloading chutes, motor trucks and trailers, dump wagons, excavators, scarifiers, graders and road rollers, which, in addition to equipment for handling and placing concrete, will give the road engineer and builder an excellent opportunity to learn methods of use and comparative values of equipment.

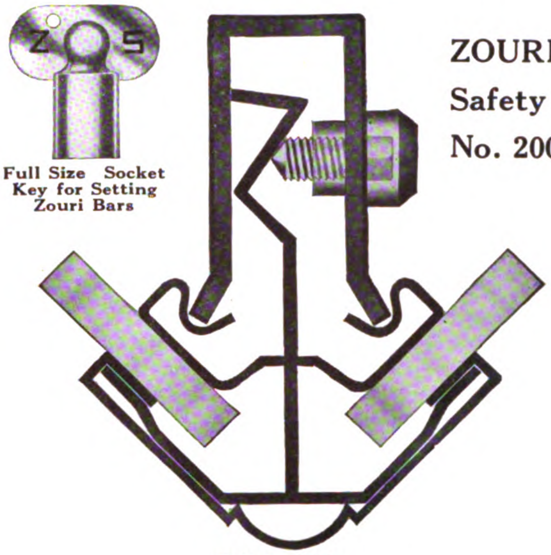
Space at the Tenth Cement Show has already been reserved for more than one hundred and fifty exhibitors.

◆

Public Safety Committee, Los Angeles, Cal., recommends an amendment to the building laws, permitting concrete or terra cotta construction for flue vents for heating appliances in buildings. Such construction now is limited to galvanized iron.

ZOURI

Safety Store Front Construction



Full Size Socket Key for Setting Zouri Bars

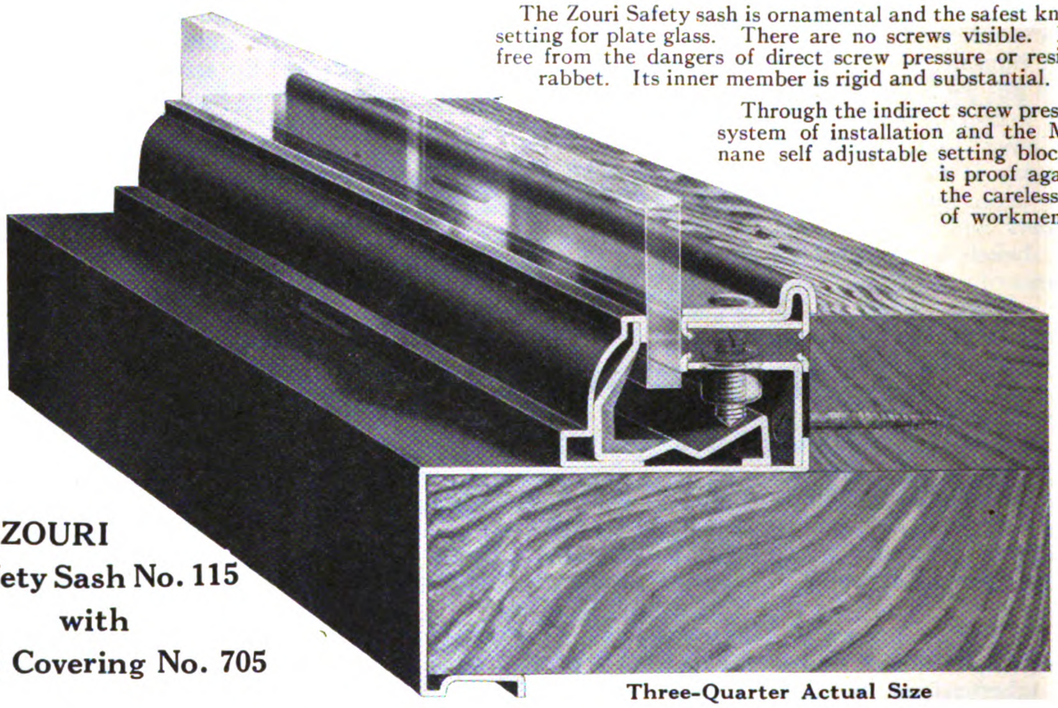
FULL SIZE

ZOURI
Safety Key-Set Corner Bar
No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



ZOURI
Safety Sash No. 115
with
Sill Covering No. 705

Three-Quarter Actual Size

DETAILS MAILED ON APPLICATION

Zouri Drawn Metals Company

1813-1833 East End Avenue **Chicago Heights, Illinois**

Operating under Murnane and Marr Patents

AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

EVANGELISM IN A BRICK FACTORY

The Western Brick Company, Danville, Ill., has introduced a new stunt in clay plant practice. Evangelist Jack Masters has been accorded the privilege of conducting religious services in the machine room during noon hours. That the men enjoy spiritual nourishment with their sandwiches is evidenced in the fact that of four hundred and fifty employees about fifty per cent attend the meetings, which are made up of ten minutes of song, participated in by all present, and twenty minutes of sermonizing.

The idea is not new. For years the Y. M. C. A. has conducted "shop meetings" as a regular part of its propaganda for community betterment. Religious, travel, educational, physical and general talks are given by experts. The moving-picture and stereopticon machine are utilized. In addition inter-factory athletic meets are scheduled. Traveling libraries are used, from which the men select books for general reading or technical volumes for study. During the year the local branch of the Y. M. C. A. is turned over to factory employees and a "factory social night" is given. This brings the men into direct contact with the intensive work of the association.

That such a propaganda is productive of incalculable good, both to employers and employees, in that it brings them to a more sympathetic understanding of each other's problems, and that it is certain to be of increasing service to industrial communities, cannot be doubted.

◆

A FIRESAFE RABBIT TRAP

In a recent bulletin from the United States Reclamation Service appears the following description of a fireproof rabbit trap:

"An inexpensive and permanent sewer-pipe trap for cottontail rabbits, which has proved very effective in Kansas, is described below. To make the trap proceed as follows:

"Set a 12 by 6-inch 'T' sewer-pipe, with the land end downward, and bury it so that the 6-inch opening at the side is below the surface of the ground. Connect two lengths of 6-inch sewer-pipe horizontally with the side opening. Second-grade or even broken tile will do. Cover the joints with soil, so as to exclude light. Provide a tight removable cover, such as an old harrow disk, for the top of the large tile. The projecting end of the small tile is then surrounded with rocks, brush, or wood, so as to make the hole look inviting to rabbits and encourage them to frequent the den. Rabbits, of course, are free to go in or out of these dens, which should be constructed in promising spots on the farm and in the orchard. A trained dog will locate inhabited dens. The outlet is closed with a disk of wood on a stake, or the dog guards the opening. The cover is lifted and the rabbits captured by hand.

"These traps are especially suitable for open lands and prairies where rabbits cannot find natural hiding places. They are permanent and cost nothing for repairs from year to year. If it is desired to poison rabbits the baits may be placed inside these traps, out of the way of domestic animals or birds. This trap also furnishes an excellent means of obtaining rabbits for the table or even for market."

Excellent! Thus does the Government help to solve the problem of the high cost of eating. Now let some genius devise an inexpensive trap, to be used by city folk in catching the Christmas and New Year turkey. But such a contrivance must be of firesafe material. (Why not walk into the butcher shop and interview the proprietor—with brick, a concrete block, or a goodly chunk of terra cotta in your palm?)

A NEW REINFORCING PLATE

The Berger Manufacturing Company has produced a new ribbed reinforcing plate, named Ribplex.

The design is a plexus of strands forming meshes between V-shaped stiffening or supporting ribs. At their base these ribs have an inverted arch-shaped formation from which the turned-on-edge mesh strands start, a combination which increases the strength and rigidity of the plate, adding materially to its utility and quality. The manufacturing process has been developed to a perfection that insures a uniform product throughout.

Ribplex is a combined centering and reinforcement, especially adapted for reinforcing floors, roofs, sidewalls, partitions, stucco construction, suspended ceilings and practically all kinds of construction where concrete or plaster is used.

A most desirable feature is that the small meshes formed between the ribs prevent the soft concrete from running through and make an excellent bond with the concrete, so that it is possible to develop the full tensile value of the metal.

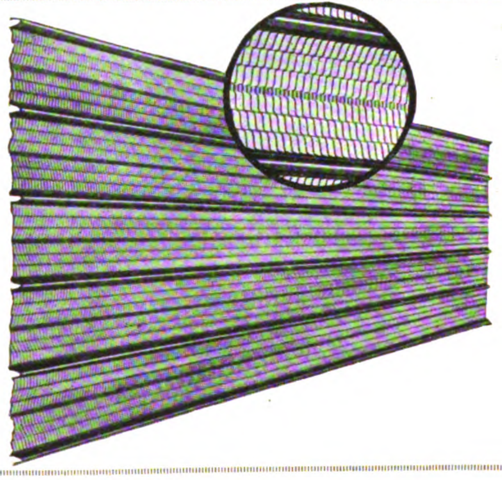
The Berger Manufacturing Company, Canton, O., will forward, on request, detailed information on Ribplex and send samples and prices to prospective purchasers.

◆

The more some say the more they reveal how little they know.

◆

In Life as in Constructiondom, what counts is the scale on which plans are drawn and carried out.



Patented
Reinforcing
Plate
of
Berger
Manufacturing
Company

REYNOLDS

FIRE APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS TRADE MARK H.M.R. ESTABLISHED 1868 SAFE

SHINGLES

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

UNDERWRITERS' LABORATORIES, INC.
INSPECTED
ROOFING MATERIAL
CLASS C
ISSUE No. 118

If your dealer cannot supply you write the factory.

H. M. Reynolds Asphalt Shingle Co.

"Originators of the Asphalt Shingle"

Grand Rapids MICHIGAN

Do Business by Mail

It's profitable, with accurate lists of prospects. Our catalogue contains vital information on Mail Advertising. Also prices and quantity on 6,000 national mailing lists, 99% guaranteed. Such as:

War Material Mfrs.
Cheese Box Mfrs.
Shoe Retailers
Contractors
Druggists
Wealthy Men
Axle Grease Mfrs.
Auto Owners
Tin Can Mfrs.
Farmers, Etc.

Write for this valuable reference book; also prices and samples of fac-simile letters.

Have us write or revise your Sales Letters.

Ross-Gould, 1001 Olive St.

Ross-Gould
Mailing
Lists **St. Louis**

If you are a Manufacturer *of* Firesafe Material or Protective Devices,

consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advances and proves the argument for proper fireproofing

and

(2) what it actually accomplishes to increase the use of firesafe materials and devices.

The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building planning, construction, equipment and maintenance.

The second purpose is accomplished by *actively fighting for legislation favoring firesafe construction* and against laws permitting the continued use of wood——and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that *makers of fireproof materials are now getting but one per cent of the business which ought to be theirs,* that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the co-operation it merits.

The Fireproofing News

TRADE NOTES

United States Steel Corporation, states a report, has started work on 165 new homes at Gary, Ind., to cost $1,000,000, and to be occupied by operating officials of the new plant for the American Sheet & Tin Plate Company, which will employ 4,000 men.

◆

The new office of the General Roofing Manufacturing Company at New Orleans is located at 417 Magazine street.

◆

Somerville, Mass., fire insurance rates have been advanced because of wood construction and the general use of wood shingles.

◆

Howard M. Nichols, secretary-treasurer of the Associated Roofers of America, says that the A-R-A specification for composition roofs is increasing in popularity. The 1917 convention of the association is scheduled for January 17 and 18, at Chicago.

◆

Boston's Building Commissioner, Patrick O'Hearn, has been investigating the fire-resisting qualities of asphalt shingles, as the Massachusetts legislation recently amended an incombustible roofing act to include the use of asphalt shingles approved by the Boston Building Commissioner. To-date reports state Mr. O'Hearn has not approved their use.

◆

Fischer Lime & Cement Company, Memphis, Tenn., filed a complaint with the Interstate Commerce Commission against the Southern Railway Company, stating freight rates on carloads of lime and Portland cement are exorbitant.

◆

City National Bank, Paris, Tex., will build a modern bank and office building of concrete at a cost of $75,000. Enameled terra cotta and brick will also be used.

◆

C. F. Messinger has been appointed manager of the concrete mixer department of the Chain Belt Company, Milwaukee, Wis. Mr. Messinger was for years their advertising manager and is a graduate of Sheffield Scientific School, Yale University.

◆

M. C. Bowden, contractor of Galveston, Tex., has some 800 of the concrete monoliths cast, to be used for backing a portion of the boulevard with concrete piling. The part of the seawall to be strengthened runs from Sixth street and Broadway to Twenty-second street. The driveway will be reinforced 100 feet back of the seawall.

◆

Charles H. Bryan, Detroit brick manufacturer, has been chosen as treasurer of the Detroit Board of Commerce.

◆

Albion Shale Brick Company, Albion, Ind., has been awarded the contract to supply all the vitrified brick to be used for the fiscal year by the city of Louisville, Ky.

◆

Paducah, Ky., and neighboring brick makers, are affected by the statement of new tariffs, which mean a decrease of 100 to 200 per cent on freight rates for shipments to Southern territory. The Paducah Board of Trade has been working for this reduction for many months.

◆

Frank L. Shafer Co. and McDonald Coal & Brick Co., Detroit, Mich., have consolidated. Organization of both concerns will continue as heretofore, offices being maintained at Kresge Building, Detroit. The merger gives combined firms a total of four yards. Mr. McDonald, Mr. Shafer, E. G. Prout and H. T. Janney will continue in active work for the new company.

◆

It is human nature to pass on the blame.

NEW FIRESAFE CONCERNS

Cumberland Mountain Minerals Company, Cumberland Gap, Tenn., has bought the plant of the Lumbermen's Cement & Brick Company, Carlyle, Kan., and will remove it to Cumberland Gap, where it will be re-erected on a 300-acre tract. The capacity will be thirty carloads of cement per day.

Southern Cement Casket Company, Houston, Tex., plans to erect three new factories. E. Hartman, patentee, 3212 Harrisburg Boulevard.

Moscow Fire Brick & Clay Products Company, Moscow, Idaho, has started to manufacture their product. John Nisbet is secretary.

Eastern Illinois Clay Company, St. Anne, Ill., has just completed its new plant.

Streator Clay Manufacturing Company, Streator, Ill., has started operating its new plant. R. H. Green is president, James A. Green, vice-president, John Connelly, secretary.

Martinsville Brick Company, Martinsville, Ind., has commenced manufacturing. E. J. Poston is president, B. C. Poston, vice-president, C. E. Sweet, secretary.

J. Wilton Jones, sheet metal merchant of New Orleans, La., has increased capacity of his warehouse threefold.

Cannelton Clay Products Company, Cannelton, Ind., has filed articles of incorporation. Incorporators are: M. F. Casper, Henry Heck and T. W. Irwin.

Clay Products Company, Brazil, Ind., will erect another brick manufacturing plant.

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

THE LAKEWOOD MASON SUPPLY CO.

DEALERS IN

BUILDERS SUPPLIES

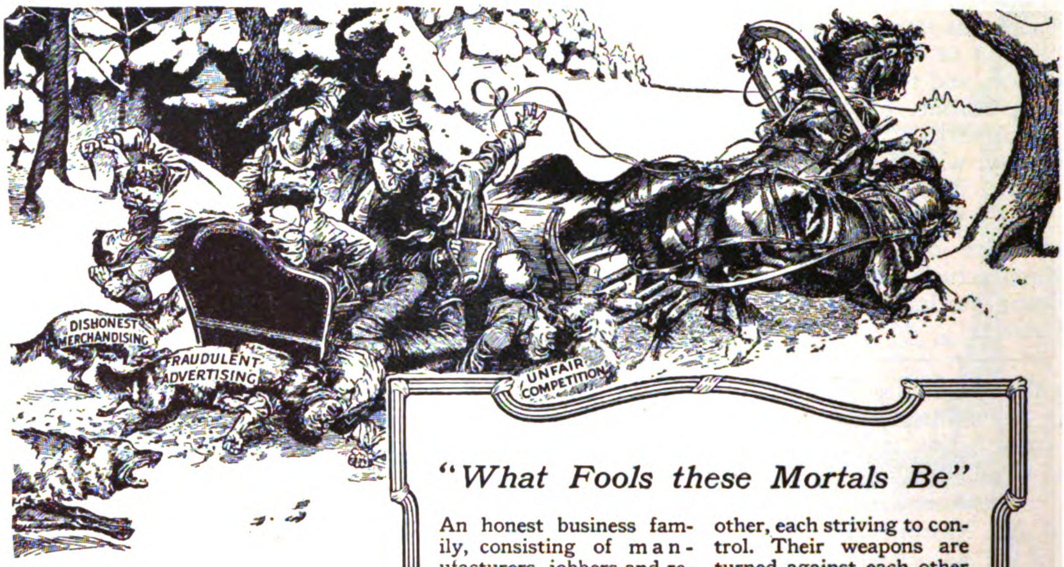
and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const. Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

OFFICES AND WAREHOUSE:

11201 BEREA ROAD

LAKEWOOD, O.



"What Fools these Mortals Be"

An honest business family, consisting of manufacturers, jobbers and retailers, is driving through the forest of distribution to the market place. The woods are beset with hungry wolves, and the only safe route is along the well-marked road of intelligent advertising. The driver is a safe and experienced Advertising director and the members of the party are armed with cash resources, ability and experience, with which they may fight their common enemy, the wolves. They are all anxious to obtain the profits awaiting them at the market place and they show some impatience at the time the journey requires. Finally there is a dispute as to a shorter course to be followed. The manufacturer, the jobber, the retailer and the consumer, each insists on dictating the way. Suddenly they seize the reins and the frightened horses plunge off the established road. Then the men attack each other, each striving to control. Their weapons are turned against each other and immediately their common enemies, Fraudulent Advertising, Dishonest Merchandising, and Unfair Competition come closer to the sleigh. The wolves realize that their victims are being prepared for them. Their jaws snap eagerly in anticipation of the feast. It is evident that the entire party is doomed if the family conflict continues. One by one the members will be dragged down by the wolves. Their fate is inevitable—but harken! Hear those shouts at a distance! Another party is approaching at top speed! There is yet hope, for it is the Vigilance Patrol maintained by The Associated Advertising Clubs of the World. Business will be rescued! The guns of the truth-in-advertising forces will be turned on the marauders and the family will be conducted to the safety of public confidence.

This is one of a series to Advertise Advertising—by the Associated Advertising Clubs of the World (headquarters Indianapolis). The illustration is used through the courtesy of the publishers of "Puck" The text was prepared by Merle Sidener, chairman of the National Vigilance Committee of the Associated Advertising Clubs. Write for booklet, written for buyers like yourself. Every man or woman who buys any kind of commodities will find it profitable reading.

ASSOCIATED ADVERTISING CLUBS OF THE WORLD
TRUTH

SEP 18 1916

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

▪ ▪ ▪ ▪ ▪

WITH A DEPARTMENT DEVOTED TO
SAFE HOMES

CHATEAU FRONTENAC AT QUEBEC

VOL. III AUGUST, 1916 No. 2

Firesafe Home Building

Fire-resisting Properties of Metal Ceilings

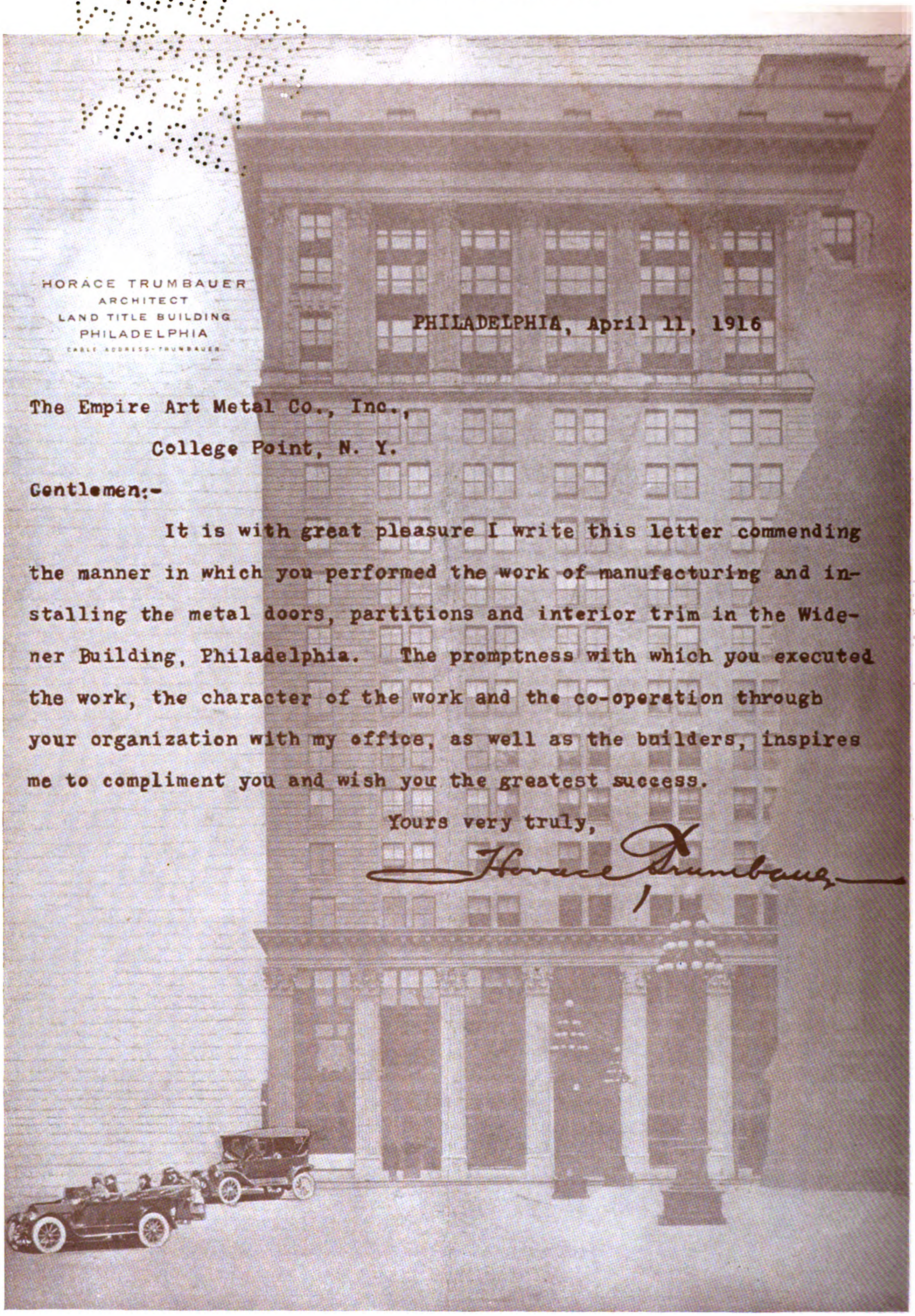
A Model Building Code for Municipalities

How Chateau Frontenac Was Saved by a Metal Fire Door

Price 20 Cents **$2.00 Per Annum**

OFFICIAL JOURNAL OF SOCIETY ADVOCATING FIRE ELIMINATION

SOCIETY ADVOCATING SAFE FIRE ELIMINATION
PROTECT YOUR HOME



HORACE TRUMBAUER
ARCHITECT
LAND TITLE BUILDING
PHILADELPHIA
CABLE ADDRESS-TRUMBAUER

PHILADELPHIA, April 11, 1916

The Empire Art Metal Co., Inc.,
College Point, N. Y.

Gentlemen:-

It is with great pleasure I write this letter commending the manner in which you performed the work of manufacturing and installing the metal doors, partitions and interior trim in the Widener Building, Philadelphia. The promptness with which you executed the work, the character of the work and the co-operation through your organization with my office, as well as the builders, inspires me to compliment you and wish you the greatest success.

Yours very truly,

Horace Trumbauer

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

▪ ▪ ▪ ▪ ▪

WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

A TYPE OF MODERN ROOF PROTECTION

VOL. III **SEPTEMBER, 1916** **NO. 3**

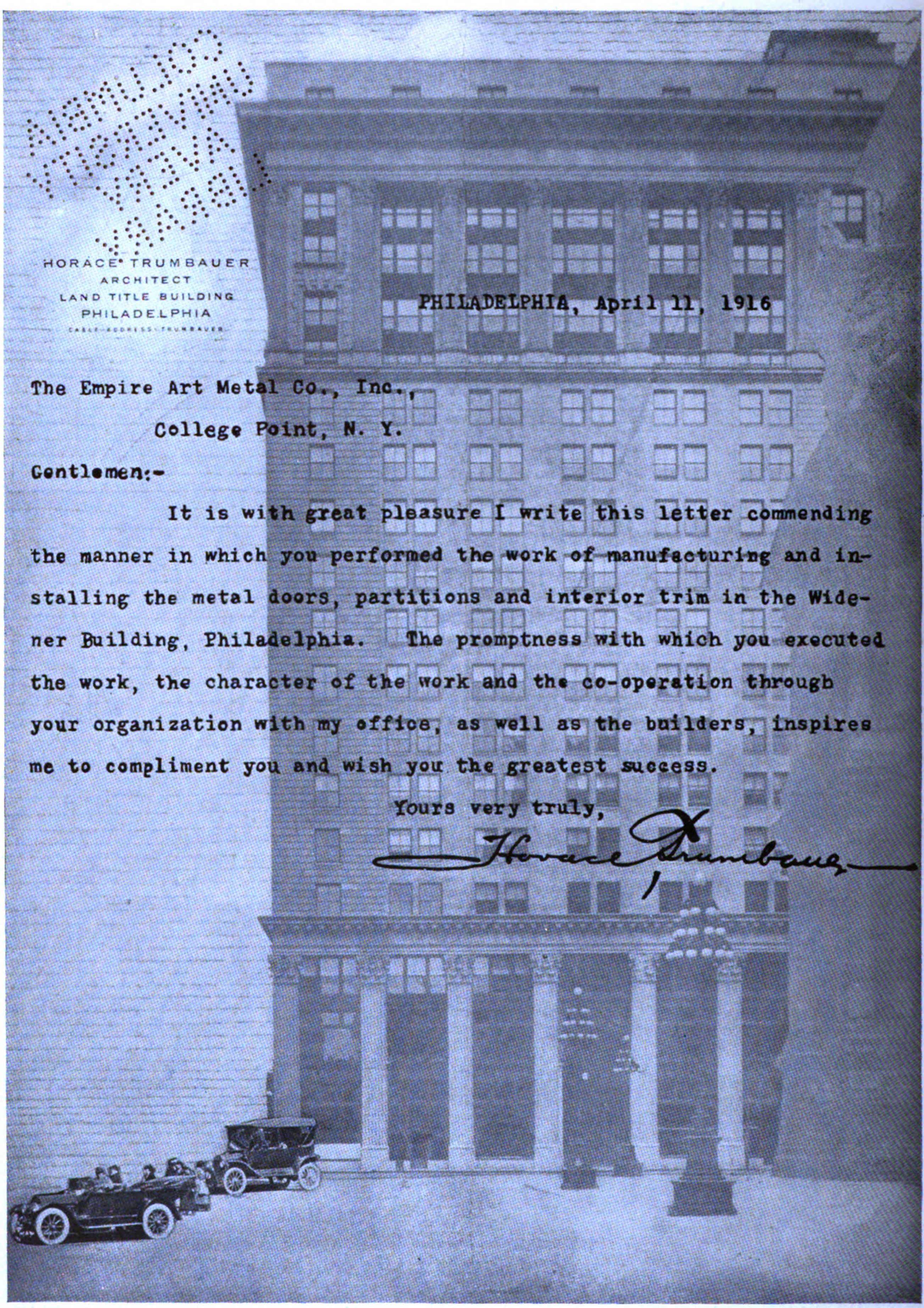
The Sensible Roofing of the Home

Fire Prevention in School Buildings

Incombustible Lathing Material

Price 20 Cents ***$2.00 Per Annum***

OFFICIAL JOURNAL OF SOCIETY ADVOCATING FIRE ELIMINATION



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Horace Trumbauer

CONSTRUCTION

ADVOCATING THE CONSISTENT USE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

▪ ▪ ▪ ▪ ▪

WITH A DEPARTMENT DEVOTED TO
SAFE HOMES

CONCRETE FOR INDUSTRIAL HOME BUILDING

VOL. III OCTOBER, 1916 No. 4

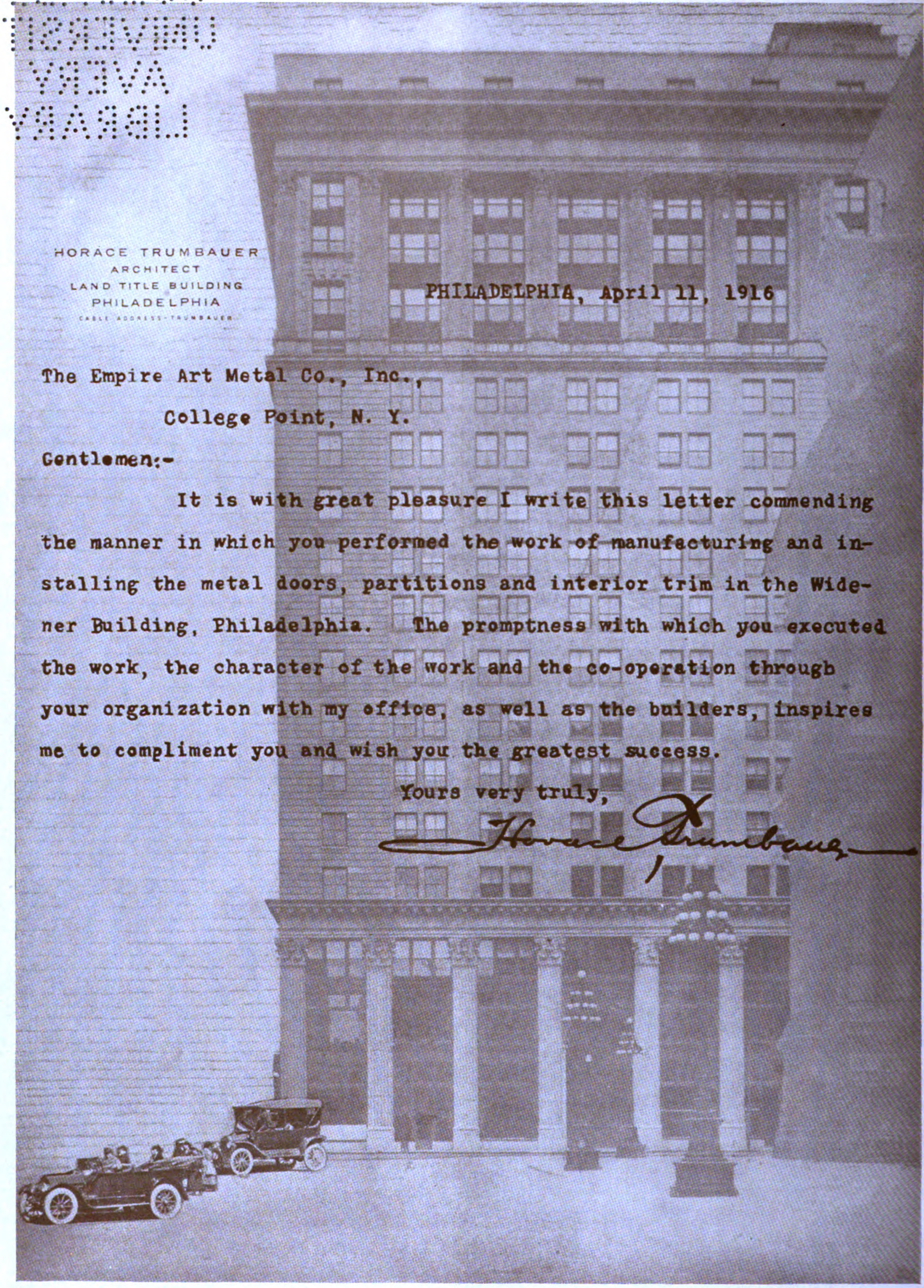
Concrete and Stucco Home Building

Tabulating the Nation's Fire Loss

Phoenix, N. Y. Conflagration

Price 20 Cents $2.00 Per Annum

OFFICIAL JOURNAL OF SOCIETY ADVOCATING FIRE ELIMINATION



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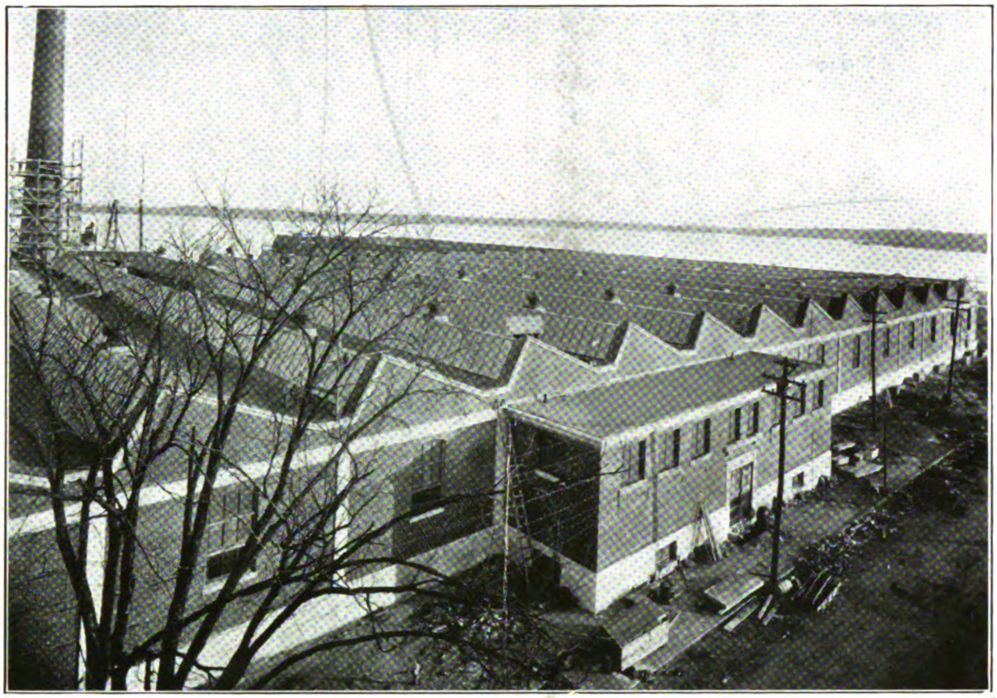
The International FIRESAFE Building Publication

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES



Firesafe Factory Construction at Salem, Mass.

Special Departments

- *Automatic Sprinklers*
- *Gypsum*
- *Insurance*
- *Legal*
- *Portland Cement*

Vol. III NOVEMBER, 1916 No. 5

Fire Prevention in Railway Shop Property
Inefficient Fire Alarm Service at Providence
Properties and Uses of Gypsum
Development of Portland Cement
Importance of Automatic Sprinklers
Logical Advancement of Firesafe Buildings

WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

(Official Journal of Society Advocating Fire Elimination

Price 20 cents

$2.00 Per Annum

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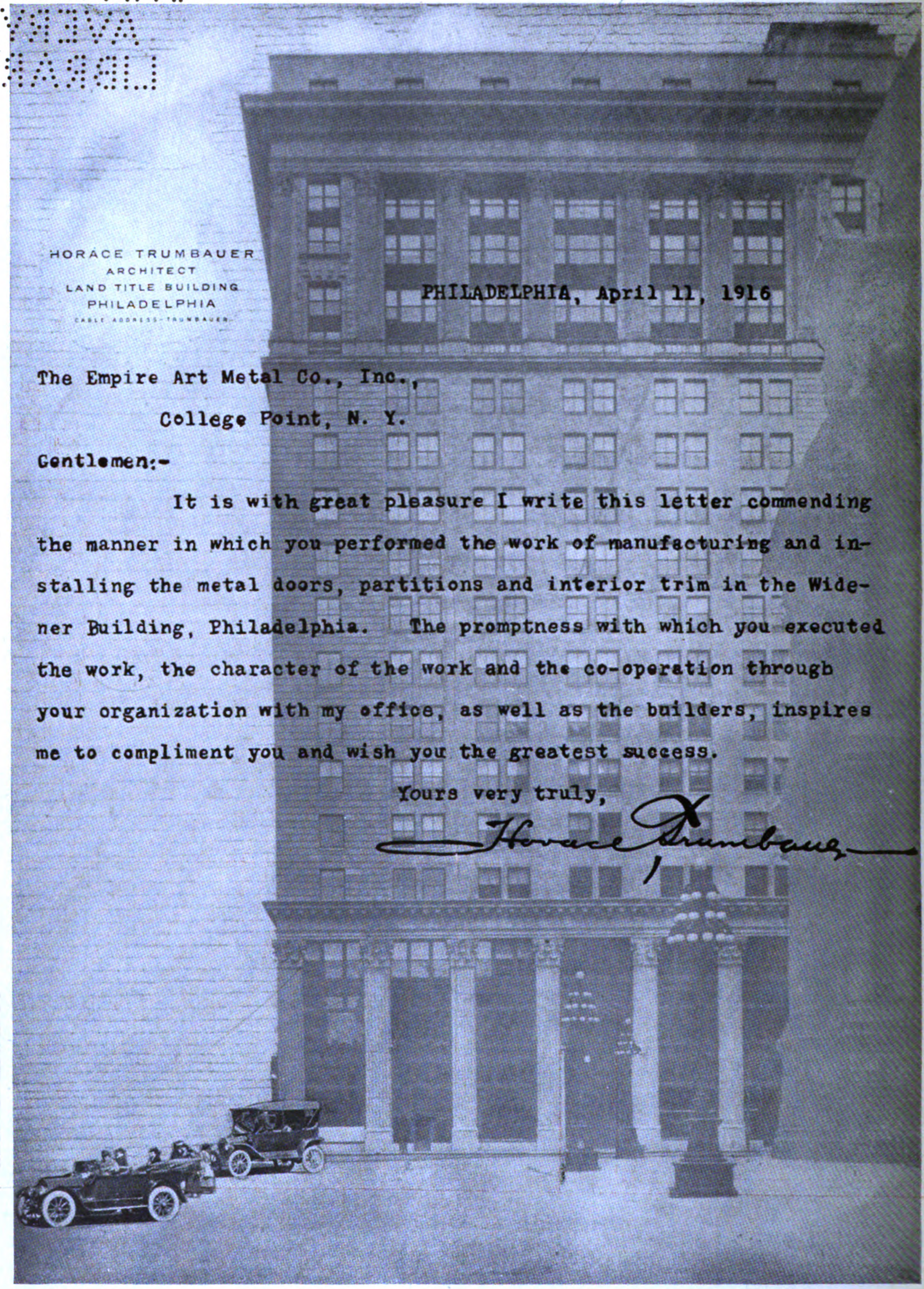

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The International **FIRESAFE** ***Building Publication***

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES

An Attractive and Firesafe Exterior of Face Brick and Cement.

Special Departments

- ***Automatic Sprinklers***
- ***Gypsum***
- ***Insurance***
- ***Legal***
- ***Portland Cement***

Vol. III DECEMBER, 1916 No. 6

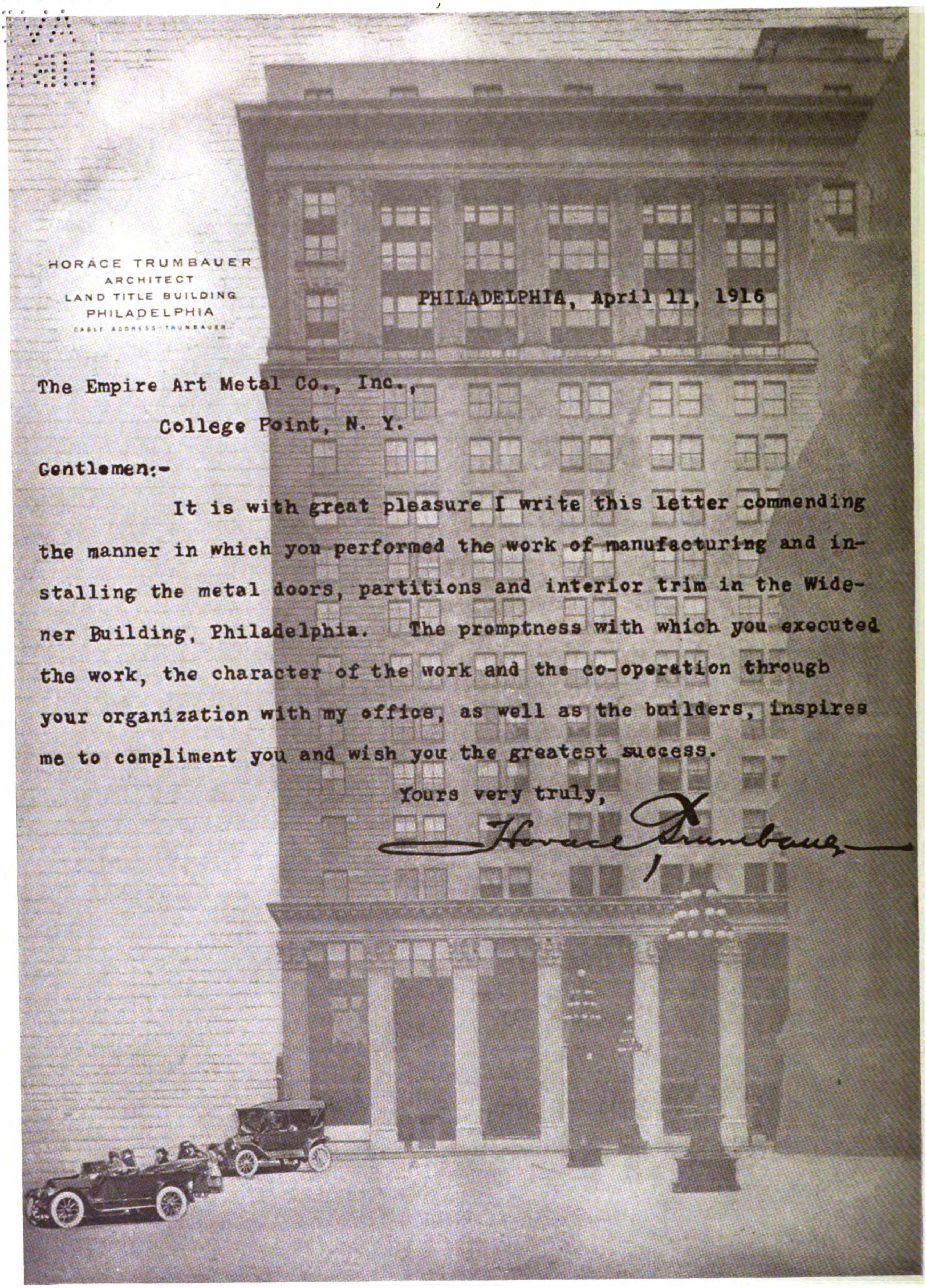
- ***Underwriters and Property Owners Co-operate***
- ***Remarkable Development of Record Protection***
- ***Reinforced Concrete Construction Forms***
- ***The Palatial Fire Traps of America***
- ***Fundamentals of Safe Contracts***
- ***The Fire-Resistive Qualities of Gypsum.***

WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

Price 20 cents

$2.00 Per Annum



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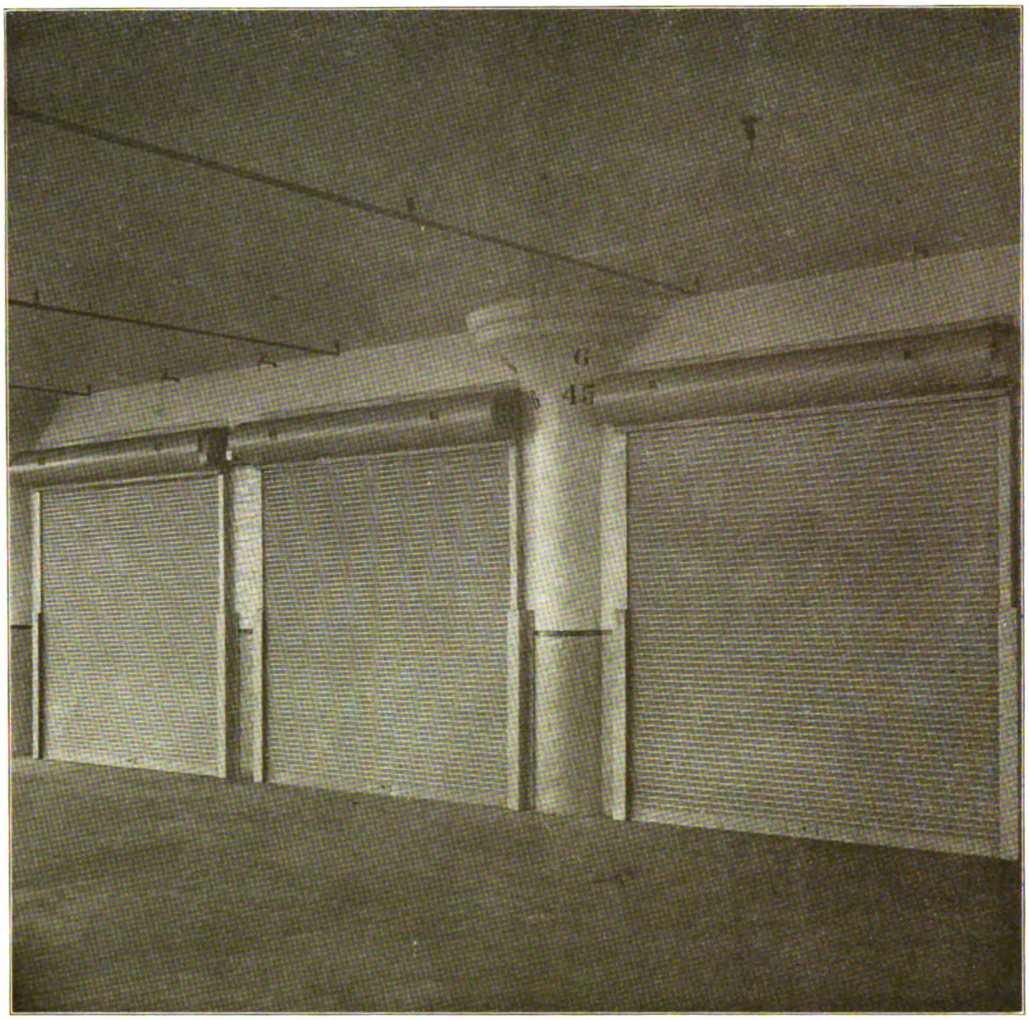

FORD SERVICE BUILDING—PHILADELPHIA, PA.

TYPICAL INSTALLATION
OF
Kinnear Steel Rolling Doors
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KINNEAR PRODUCTS

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Dust, dampness, mice and fire cannot touch your records.

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